

Effects of the Training Process and Student Response to Hand Under Hand Instruction

by

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## ABSTRACT

In the field of visual disabilities, students who have visual impairments in addition to other disabilities receive limited amounts of direct service time from a teacher of students who are visually impaired (TVI), leaving most of their education in the hands of special education teachers and paraprofessionals. These professionals can support their students with visual impairments; they just require additional support and training to better understand the unique needs of this population and the teaching strategies that are most effective for these learners. This action research study used a mixed method multiple baselines across participants methodology to first determine if the Teaching Skills Training Program (Parsons et al., 1993) is an effective strategy for training paraprofessionals on the targeted teaching strategy of hand under hand instruction. It then examined student behavioral responses to add to the literature base on the effectiveness of the hand under hand strategy when working with students who are visually impaired. Participants were recruited from three separate classrooms within a level D placement option for students with developmental disabilities, including one paraprofessional and one student from each classroom. The results indicate that the training protocol was effective, with each paraprofessional reaching close to 100% success in implementing hand under hand, acceptability of both the training method and teaching strategy, and improved student performance on all variables. The study suggests possible benefits of regular use of the training methodology when training paraprofessionals, and increased use of the hand under hand strategy within the local context.

## DEDICATION

Maika and Alakai, from the moment I considered pursuing this journey you have been my number one supporters. At just 10 and 5 years old, you agreed to stay by my side as we navigated the doctoral journey together. Maika, you read, edited, and talked me through concepts and ideas that baffled me. While Alakai reminded me of my strength and encouraged me to focus and stay diligent. As you continue to grow, and the years pass, you'll forget about the late nights, early mornings, and extended time allowed on technology. I, however, will never forget the sacrifices you made, the attention you shared with my work, and the unwavering belief in my ability to make it to this finish line. Through this journey, I hope to have instilled confidence within your soles, a desire to work hard for things that matter, and an understanding that through slow, steady, consistent work you can obtain anything.

“All our dreams can come true, if we have the courage to pursue them.”

Walt Disney

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## GLOSSARY

1. “All in”: Term created by the researcher, meaning that the adult places or expects the student to place their hands on top of the hands of the adult 100% of the time. “All in” does not account or allow for the student’s hands to venture off the adults to encounter the materials or create an opportunity for role releasing responsibilities to the student.
2. Role release: When the adult teaches a student what to do, then slowly releases responsibility of portions of the activity to the student based on their individual readiness. For example, if picking up items from a table and putting them into a container, an adult might pick up an item with the student joining through hand under hand, then allow or encourage them to complete the final step of placing the item into the container.
3. Backwards chaining: The adult completes all or most of the steps in an activity, then encourages the student to do the final step with increased independence. As the lesson continues, or time passes, the adult increases expectations by expecting the student to complete the final two steps, then the final three steps, and so on until the student is independently completing the entire activity.
4. Partial participation: This occurs when the adult accepts the student participating in any way that they can. The approach is often reserved for students with additional disabilities but can also be relevant to gain trust with resistant learners. Examples: a student with limited use of upper extremities reaches out to touch the hand of an adult when they want another bite of food; a student who is resistant to instruction reaches out to touch the hand of an adult to tell them to release an item into a container.

## CHAPTER 1

### INTRODUCTION AND CONTEXT

*“Comparison is the thief of joy.”*

*-Theodore Roosevelt*

*Visualize a self-contained special education classroom: a classroom designed for students with developmental disabilities, maintaining a small staff to student ratio (2:1) and no more than 8 students. The design described allows for ample direct instruction and support needed to meet the individual needs of the student population. Some of the supports or accommodations implemented might include picture symbols, a combination of low- and high-tech visual communication options, a visual calendar to plan the day, visual modeling in person and through video modeling, and physical assistance as necessary.*

*Now consider that one student has a visual impairment in addition to other disabilities. The student has low vision and clearly sees something, but due to other disabilities it is unclear just how much they are receiving and interpreting through visual modalities. Developmentally this student “fits” in this classroom; however, the accommodations implemented for the rest of the student population just aren’t appropriate. The behavior of this student might range from being passive and just moving through the day, to being frustrated, resistant, or refusing to participate. This student might pull away from physical assistance or refuse to participate in an activity that isn’t meaningful or adapted for a student with a visual impairment. Direct and specialized instruction is provided to this student by a teacher of students who are visual impaired (TVI), but to what extent? Who is bridging the gap when the TVI is not*

*present? Who is ensuring this student has access when they themselves can't communicate their needs and to the untrained eye they "seem fine"?*

Special education teachers and paraprofessionals are the driving force behind the education of students like the one described in the opening vignette. These professionals provide most of the education to students in their classrooms, with support coming from other related service providers. Special education teachers and paraprofessionals are often phenomenal at what they do and have the skills necessary to provide appropriate instruction to their sighted student population. However, they are limited in their experiences and understanding of the unique needs of their students who have visual impairments, because vision loss is rare, leaving these professionals ill equipped to bridge the gap when a TVI isn't in the room, which is most of a student's day.

In this initial chapter, the foundation for this study is established and the purpose of this action research dissertation is identified. Through a review of national data highlighting the prevalence of visual impairments among students receiving special education services in the United States, an overview of the unique needs of this population, and national initiatives within the field of visual disabilities, the necessity of additional training for the special education teachers and paraprofessionals working with students who have visual impairments is conveyed. Then, a rationale for the need for additional research in the field of visual disabilities on the strategies being used when educating this population of students through the highlighting of national initiatives in special education, including a drive for evidence-based and high-level practices, is provided. These two concepts, the need for training and development for special education teachers and paraprofessionals, and the need for research in disability-specific

teaching strategies, merge together through a quick review of the first two cycles of research in this action research study, which set the foundation for this dissertation.

### **Visual Impairment, A Low Incidence Disability**

In 2022 the National Center for Educational Statistics (NCES), reported that there were 7.2 million students being served in special education under the Individuals with Disabilities Act (IDEA) during the 2020-2021 school year, equating to 15% of all public-school students. Of those 7.2 million students, less than .5% were identified as students with multiple disabilities, hearing impairments, orthopedic impairments, visual impairments, traumatic brain injuries, and deafblindness. According to IDEA Section 1462 (c) visual impairments are considered a low incidence disability along with hearing impairments, deafblindness, and significant cognitive impairment. Low incidence disability refers to any impairment requiring instruction from personnel with highly specialized skills and knowledge (IDEA Section 1462 (c), 2004).

The NCES collects and reports data on all students in the United States receiving special education services under IDEA, with breakdowns by eligibility category. The NCES data reports low incidence disabilities grouped together as one unit, informing that of all special education students less than .5% are receiving services as a student with a low incidence disability, meaning that less than .5% of the entire special education population are students with visual impairments (NCES, 2022). The American Printing House for the Blind (APH) collects additional annual data on students with visual impairments who are legally blind, offering a more in-depth breakdown for this population of students.

The 1879 federal *Act to Promote the Education of the Blind* requires the annual reporting of all students receiving services as a student with legal blindness (APH, 2021).

This reporting takes place in the form of annual federal quota registration through the APH. Federal quota funds are allotted to provide necessary materials to all identified students, with the registration process providing substantial data on this group of students. During the 2021 fiscal school year, APH (2021) reported 56,866 students were registered as legally blind in the United States. In addition to tracking data on eligibility as a visually impaired student, APH categorizes this population further through the collection of data on the preferred reading medium for students, which is reported as: visual reader, braille reader, auditory reader, pre-reader, or symbolic/non-reader. The 2021 annual report identified that of the 56,866 registered students, 18,935 were print readers, 4,646 were braille readers, 5,581 were auditory readers, 10,227 were pre-readers, and 17,477 were symbolic/non-readers (APH, 2021). This report defined symbolic/non-reader as “students who do not demonstrate traditional print or braille reading potential (symbolic readers); non-reading students; students not working on or towards a readiness level; students who do not fall into any of the other categories” (p. 25).

The vast population of students who have visual impairments and additional disabilities have limited access to learning materials and curriculum. APH does not collect data on co-occurring disabilities; it is, however, safe to assume that the 17,477 of students (32.5% of the reported population) identified as symbolic/non-readers are students who have additional disabilities participating in educational settings like the one described at the start of this chapter. Visual impairment alone is not a cognitive impairment affecting the ability to learn to read either print or braille, leaving co-occurring disabilities as the only explanation for the high prevalence of students categorized as symbolic/non-reading.

## **Need for Specialized Instruction**

A TVI is the professional responsible for providing specialized instruction to students identified as having a visual impairment. TVIs are highly knowledgeable of the unique learning needs possessed by students with visual impairments. They are equipped to provide the instruction that is necessary for complete access to the educational landscape, including the skills necessary to access and be independent in a classroom. TVIs are responsible for providing specialized instruction on disability specific skills outlined in the expanded core curriculum (ECC) (Olmstead, 2005; Wolffe et al., 2002) in addition to, not in replacement of, the core curriculum. The need for specialized instruction for these students is characterized by their inability to learn incidentally by watching what is happening. The inability to learn incidentally is the foundation of what makes this population unique, requiring direct instruction in all skills outlined in the nine areas of the ECC.

## ***Needs of Students with Co-occurring Disabilities***

Morale et al. (2012) suggested that “up to two-thirds of children with visual impairments have other identified special educational needs, co-occurring most frequently with neurological or developmental conditions such as autism, attention-deficit/hyperactivity disorder or epilepsy” (p. 90); this claim is in alignment with the data reviewed earlier from APH (2021). Children with co-occurring disabilities, defined in this dissertation as students who have physical and/or cognitive disabilities in addition to their visual impairment, including those with combined vision and hearing loss, are at a greater disadvantage than those with a single diagnosis of visually impaired. This group of students has a unique set of barriers that may further limit their access to materials that are within arm’s reach (Erin & Spungin, 2004), leaving them dependent on adults or more knowledgeable others, as described by Vygotsky and Cole (1981), to

bridge the gap by offering information in a way that they can receive it. When compared with their sighted peers, students with co-occurring disabilities have access to less information about the physical and social world (Taylor & Preece, 2010). These students often can't express what they can and can't see, leaving that determination to be made by someone who specializes in working with students who have visual impairments.

Children with vision loss, in addition to other disabling conditions, have a unique set of educational needs that should be met by a professional trained to provide appropriate interventions for them (Wittenstein, 1995). While there is a recognized need for this population to receive specialized instruction, for a variety of reasons it is not happening in the capacity that it should be. Unfortunately, due to a national teacher shortage (Mason & Davidson, 2000) and a perceived lack of time (Allman & Lewis, 2014; Wolffe et al., 2002), students are not always able to receive the instructional time they require. The insufficient direct service time provided by a TVI seems to have an increased impact on students with additional disabilities. In addition to the shortage of TVIs available to provide adequate services for students due to time restriction, the tools designed to determine appropriate direct service time sends the unintentional message that students with co-occurring disabilities don't require as much support as students whose only diagnosis is visual impairment.

Students who have visual impairments make up a small percentage of the special education population, requiring specialized instruction from a professional who has knowledge and training on how to best support this group of learners. The National Agenda (Huebner et al., 2004), has identified and pursued goals to provide a higher quality of educational services for students with visual impairments, including those with additional disabilities, revolutionizing the thought process for educating these students. Three goals in the National Agenda are most relevant to this study because they establish

the need for additional training and support for professionals working with students who have visual impairments.

### **National Agenda**

The *National Agenda for the Education of Children and Youths with Visual Impairments, including those with Multiple disabilities*, was originally published in 1995 (Huebner et al., 2004). The *National Agenda for the Education of Children and Youths with Visual Impairments, including those with Multiple Disabilities*, from this point forward referred to as The National Agenda, established in “clear and concise terms a vision and plan of action for the future of education of children who are blind or visually impaired, as well as those who have additional disabilities” (Huebner et al., 2004, forward to original addition). The National Agenda was created in response to improvement required in meeting the unique needs of learners who have visual impairments, including those with multiple disabilities (Huebner et al., 2004). The original version of The National Agenda included eight goals; in 2003 a committee approved revisions including the addition of two new goals. Each of the 10 current goals are defined in Table 1.

**Table 1**

*The National Agenda Goal Statements*

Goal	Goal Statement
1. Referral	Students and their families will be referred to an appropriate education program within 30 days of identification of a suspected visual impairment.
2. Parent Participation	Policies and procedures will be implemented to ensure the right of all parents to full participation and equal partnership in the education process
3. Personnel Preparation	Universities with a minimum of one full-time faculty member in the area of visual impairment will prepare a sufficient number of teachers and orientation and mobility specialist for students with visual impairments to meet personnel needs throughout the country.



4. Provision of Educational Services	Caseloads will be determined based on the assessed needs of students
5. Array of Services	Local education programs will ensure that all students have access to a full array of service delivery options
6. Assessment	All assessments and evaluations of students will be conducted by or in partnership with personnel having expertise in the education of students with visual impairments and their families
7. Access to Instructional Materials	Access to developmental and educational services will include an assurance that textbooks and instructional materials are available to students in the appropriate media and at the same time as their sighted peers
8. Expanded Core Curriculum	All educational goals and instruction will address the academic and expanded core curriculum based on the assessed needs of each student with visual impairments
9. Transition Services	Transition services will address development and educational needs (birth through high school) to assist students and their families in setting goals and implementing strategies through the life continuum commensurate with the students' aptitude, interests, and abilities
10. Ongoing Professional Development	To improve students' learning, service providers will engage in ongoing local, state, and national professional development

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Retrieved from Huebner, K. M., Merk-Adam, B., Stryker, D., & Wolfe, K. (2004). *National Agenda for Education*. The American Foundation for the Blind. Retrieved November 17, 2022, from <https://www.afb.org/national-agenda-education>

The National Agenda also outlined action items that could be taken at the national, regional, state, or local level for each goal statement. This initiative remains a comprehensive resource to help alleviate challenges that are present in the field of visual disabilities. Each of the ten established goals are relevant to the effective education of students with visual impairments in all educational settings, however, three goals are highlighted here as being most relevant in the situated context of this study. Goal 7 assures that instructional materials are provided to students in an appropriate media, and at the same time as their sighted peers; Goal 8 states that instruction will include academic content and the content of the ECC, based on individual needs; and Goal 10 reiterates the need for ongoing professional development (Huebner et al., 2004). Each of

these three goals are described in more detail and connected to the situated context and the problem being addressed in this study.

### **Goal #7: Access to Materials**

Students with visual impairments have a unique set of learning needs requiring specialized instruction from a TVI. One of the many responsibilities of a TVI is to ensure that students have access to learning materials in a mode aligned with their primary sensory channel, whether that be print, braille, or other forms of tactile or auditory accommodations. The National Agenda charged professionals with not only ensuring access to materials, but also at the same time as their sighted peers (Huebner et al., 2004). Providing accessible materials is a necessary but time-consuming process requiring diligence from the TVI. A few of the recommendations for achieving this goal at the national, state, regional, and/or local level include strategies that address production of braille, development of additional guidelines to ensure quality control in the production of materials and to provide information to assist in training of service providers responsible in the modification of materials (Huebner et al., 2004).

The students participating in this study have co-occurring disabilities and are not participating in grade level academic tasks. They are, however, receiving educational materials that need to be available in a manner that is appropriate to them. These students need materials that offer high contrast and/or a controlled environment to best use their functional vision. They depend on real items to develop and build concepts, make connections to the topics being covered in class, and to access the classroom curriculum. Alternative communication devices that consider visual limitations must be made available through collaboration with speech language pathologists and classroom teachers. The TVI is expected to ensure these practices are adhered to but is only allowed minimal amounts of time each week to do them.

The need for access to materials is applicable for all students with visual impairments, but it does not need to be the sole responsibility of the TVI, with the National Agenda item suggesting training of service providers responsible for modifications. Modifications can be made and created by a TVI, but also by a special education teacher or a paraprofessional. If a TVI completes necessary comprehensive evaluations to ensure the needs of a student are determined and understood, other professionals can then be trained in how to adapt materials and to use strategies that are best when presenting those materials. This collaboration and partnership between special educators and TVIs and the role release of materials' preparation will not only ensure students have what they need to be successful, but also empower special educators to consider a student's visual impairment during planning and implementation of all lessons.

### **Goal #8: The Expanded Core Curriculum**

The Expanded Core Curriculum (ECC) is a disability specific curriculum developed over years of research on how visual impairments affect learning and development. It is recognized that the educational needs of students with visual impairments extend beyond academic learning and that instruction needs to address core academics and the ECC based on the assessed needs of each student (Texas ECC Committee, 2014). The ECC addresses the unique and specialized needs of students with a visual impairment—needs that are directly related to their visual impairment and not shared by their sighted peers (Huebner et al., 2004). The ECC is comprised of nine areas that require direct instruction and are outlined in more detail in chapter two of this dissertation.

In a private school for students with developmental disabilities, the needs of the general population parallel the needs of students with a visual impairment, although the

root factor is different. Students who have visual impairments require specialized instruction in the ECC due to their inability to learn incidentally skills that sighted students learn independently. Students who have developmental disabilities often have trouble learning many of the skills outlined in the ECC, making this environment a natural space for all staff members to be educated on the ECC, as it relates not only to their students with visual impairments, but also to other students working on overall increased independence and access to their environments.

One of the recommendations Huebner et al. (2004) made was the need to train those writing IEP goals and objectives on how to embed the ECC into the IEP for students with visual impairments. This could be extended to include the training of staff working with students who have visual impairments on how to also embed the ECC into all daily routines and activities. Opportunities for instruction in all nine areas of the ECC are present throughout the entire school day; the options for instruction are limitless. It is imperative that, in addition to training on the ECC and how to provide instruction in all nine areas of the ECC, staff members be offered strategies that are appropriate for physical modeling in place of visual modeling. Hand under hand instruction is one method of physical modeling that offers necessary physical assistance in a respectful manner and encourages active participation by the student. Hand under hand as a teaching strategy is described further in this chapter and in greater detail in chapter two.

### **Goal #10: Ongoing Professional Development**

Goal 10 of The National Agenda outlines the need for TVIs to receive regular and ongoing professional development so that they can deliver quality instruction through in-depth knowledge of the broad skills needed to teach this population. Pre-service teacher preparation programs offer a base knowledge set required to teach students (Huebner et al., 2004), leaving it essential for professionals to continue receiving on-

going training on topics relevant to their assigned population. Upon completion of pre-service training, a TVI is qualified to teach children from birth through high school graduation, including students with all associated additional or co-occurring disabilities. As a specialized service provider, TVIs need in-depth knowledge “in many unique areas of teaching and learning such as braille literacy, learning media assessment, low vision, assistive technology, and concept development” (Huebner et al., 2004, p. 16). These professionals also require training in how to manage, supervise, and train others, as a portion of their role is training and supporting others working with their students. They must build a supportive base for continued education and access for their students when they themselves are not available.

The need for ongoing professional development is not restricted to certified TVIs and extends to those providing daily instruction to students with visual impairments. Special education teachers and paraprofessionals provide most of the instruction for students who have co-occurring disabilities and require regular and ongoing development on their students’ unique needs and on strategies that best support access to the work they are doing on a regular basis.

These three National Agenda items, access to materials, instruction in the ECC, and ongoing professional development, share one unique and consistent message: the need of training for people working daily with students who have visual impairments, including those with co-occurring disabilities. To provide access to materials, the staff working with this population of students need an in-depth understanding of the students’ unique needs, so that they can help advocate for the creation of disability specific accommodations. These staff members also require training in best practices for physical modeling and using prepared materials with their students. With proper training and professional development, all staff members working with students can

develop a better understanding of the unique needs of these students and provide ongoing instruction in the areas of the ECC during routine classroom activities and through appropriate methods of physical modeling.

### **National Initiative for Evidence Based Practices in Education**

Educational reform is at the forefront of legislation, with IDEA (2004) and No Child Left Behind (2002) requiring students to be educated through evidence-based and best practices (Guckert et al., 2016). The idea of a practice being evidence-based has increased in literature across fields other than education, demonstrating its growing influence (Perry & Weiss, 2007) on how decisions are being made on behalf of students, clients, and patients. Evidence-based practices (EBP) are instructional approaches that have been identified through the careful analysis of high-quality research to improve student outcomes (Cook et al., 2013). Perry & Weiss, (2007) offered the analogy “the ground is fertile and well-cultivated, the seed is sown, and the crop is already growing in many parts of the field” (p. 167), articulating the need to implement practices that already exist and are proven to enhance student performance.

The identification of an EBP requires careful review of quality research that uses transparent criteria to evaluate each individual study and synthesize findings across each study (Cook et al., 2013). For a practice to be identified as evidence-based, it “must be supported by studies that use appropriate research design and meet certain standards of methodological quality (Cook et al., 2013, p. 504). Organizations established to review research studies in pursuit of practices that are in fact supported by the research have flexibility in outlining the criteria they use to evaluate the studies and publish the criteria on websites accessible to the public. One such site, the What Works Clearinghouse, created and maintained by the Institute of Educational Sciences, includes a list of educational practices identified as being evidence-based organized by category. Someone

interested in a teaching practice listed can review all the studies used in rating of the strategy. Programs like the What Works Clearinghouse include categories related to the education of students with disabilities, but these resources are limited, with much of their focus being placed on general education. The Council for Exceptional Children (CEC) has developed a set of High Leverage Practices (HLP) to offer a similar resource to professionals working with students who have disabilities.

### **High Leverage Practices**

A set of HLPs were developed through a Partnership between the Council for Exceptional Children (CEC) and the Collaboration for Effective Educator Development, (CEEDAR). The HLPs were designed as a guide for effective strategies special education teachers can use when working with students who have disabilities. HLPs are strategies that can easily be used to leverage students' learning across grade levels and abilities (CEC, 2017). The availability of information about HLPs in the education of students with disabilities allows special educators to access and implement evidence-based practices, (CEC, 2017). These HLPs have been designed to offer novice teachers a toolbox that can be utilized during their initial teaching years. The division of HLPs into categories of education collaboration, assessment, social/emotional/behavioral, and instruction (CEC, 2017) allows for educators to quickly and easily identify a strategy that might be effective to address a learning need of a student or group of students.

Through a review process, 22 HLPs have been identified as the most critical for K-12 special education teachers to master (CEC, 2017). The process of identifying each of the 22 HLPs involved the thoughtful creation of the four guiding categories, followed by a review of the literature and agreement among special education teachers participating in the project (CEC, 2017). The literature base included was substantial, requiring peer-reviewed studies demonstrating the effectiveness of each practice.

This robust literature base is not available in the fields of low incidence disabilities, like visual impairments, because there aren't enough professionals doing the research or a student population large enough to use in research studies. Although the literature base is growing, it continues to be challenging to locate and identify enough research on any one strategy or practice to have it labeled as evidence-based, or high leverage. Despite the limited evidence base for strategies that are specific to learners with low incidence disabilities, appropriate strategies, such as hand under hand instruction, are naturally embedded within the HLPs associated with provision of instruction.

### **Best Practices for Students with Visual Impairments**

The low number of students with visual impairments makes it difficult to locate a large enough research base, or enough studies on one topic using a rigorous enough study design to meet the requirements necessary to have a strategy even reviewed by organizations such as the What Works Clearinghouse. There is literature outlining strategies that are effective or considered best practices when working with students who have visual impairments, students whose multiple disabilities include visual impairment, and students who are deafblind. As part of the CEEDAR Center's knowledge development activities, Luckner et al. (2016) served on the sensory impairments committee reviewing literature for evidence-based practices for students who are deaf or hard of hearing, visually impaired, and deafblind. This team reviewed a portion of their findings focused on the best practices in the areas of literacy and communication for these groups of learners. One strategy noted in the review of communication strategies for students who are deafblind was hand under hand instruction.

In the brief mention of hand under hand instruction, Luckner et al. (2016) referenced one white paper written by Barbara Miles from the National Center on Deafblindness, which was most recently revised in 2003. Hand under hand instruction is



growing in its usage in the education of students with visual impairments and those who are deafblind, but there is no research base behind the strategy. Miles (2003) encourages adults to guide students who are deafblind using hand under hand instruction in place of hand over hand instruction to avoid passive participation from the student. Hand under hand instruction is the teaching strategy being evaluated in this dissertation, with a more comprehensive discussion of the connection to HLPs in chapter two.

### **Local Context**

In the fall of 2020, I, the researcher, joined a new team of professionals at ACCEL, a private non-profit school serving students with disabilities from kindergarten through 12th grade in Phoenix Arizona. Phoenix is a major city located within Maricopa County and consists of 58 school districts (School district information, n.d). ACCEL is a private placement option for level D services under the continuum of services offered through IDEA Part B and an available placement option for all students with developmental disabilities in any of the 58 local districts. Local education agencies (LEAs) choose ACCEL to provide services to their students when the needs of the student outweigh availability of services that the district can provide at that point in time.

ACCEL has three campuses in the Phoenix metropolitan area, placing their services within a reasonable range and as a potential placement option for students enrolled in any of the local school districts. ACCEL specializes in educating students with developmental disabilities and includes a high number of students who receive regular behavioral interventions. The researcher served at ACCEL in the role of certified teacher of the visually impaired (TVI), providing direct instruction to all students with diagnosed visual impairment at each of the three locations. In addition to direct services, the researcher was available and expected to provide consultative services to all professionals working with students who have a diagnosed visual impairment. The TVI

caseload consists of 30 students, 26 receiving direct instruction, and four receiving consultation only. Most of the caseload is situated at ACCEL's largest campus in central Phoenix, comprising 24 students. Of the students attending the Phoenix campus, 19 students are distributed between four classrooms containing students in the ACCEL program, with the highest level of need as it relates to their additional disabilities and medical conditions. Participants for this intervention were recruited from three of these four classrooms.

### **Role of Special Educators and Paraprofessionals**

Special education teachers and paraprofessionals play a crucial role in the success and progress made by students with visual impairments, including those with co-occurring disabilities. "Special education teachers face the challenge of teaching students with some of the most complex learning and behavioral difficulties" (CEC, 2017, p. 8) with increased complexity added when the students' disabilities include a low incidence disability. Teacher candidates can only learn so much during their preparation programs (CEC, 2017), evidence for which was supported through the initial cycle of research and reconnaissance phase of this action research study.

At the initial phase of this action research study, structured interviews were conducted with three special education teachers: two current teachers, each of which had students with visual impairments on their caseload at the time, and one certified special education teacher who was in the position of Director of Training and Development at ACCEL. Through these interviews, it became clear that teachers in this setting had limited understanding of their students' visual impairments and their needs, and of how vision loss was affecting all areas of development including behavior, and had no training through the agency or their preservice education programs on visual impairments. While these findings were not a surprise, they were enlightening. Special

education teachers and paraprofessionals provide most of the direct instruction for students who have visual impairments and additional disabilities, and they do not appear to be equipped to do so. This finding highlighted the need for training on essential topics and teaching strategies that are identified as best practices when working with students who have visual impairments, and strategies and/or topics most critical to train them on.

The Teaching Skills Training Program is a tiered training protocol that was originally designed to provide training to staff members working with adults in a residential facility (Parsons et al., 1993). The Teaching Skills Training Program was later refined and tested in other settings, with varying populations of learners, including preschoolers, and across teaching skills. The Teaching Skills Training Program was replicated in the second cycle of this action research study and those findings were used to further develop and inform this dissertation. The results of the second cycle are outlined in more detail in chapter two.

### **Purpose Statement**

Students with multiple disabilities that include visual impairments make up less than .5% of the entire population of special education students in the United States and have a unique set of needs that require specialized instruction from a TVI. Due to factors, such as shortages of qualified professionals and a perceived lack of time, students with visual impairments and co-occurring disabilities frequently receive limited amounts of direct specialized instruction from a TVI, leaving the responsibility to make accommodations in the hands of special education teachers, mostly paraprofessionals. A review of the literature, in addition to previous cycles of research, reveal that special education teachers and paraprofessionals have limited to no knowledge or training on how to provide effective instruction to their students who have a co-occurring visual

impairment. For this reason, the purpose of this study was to first determine the effectiveness and acceptability of the Teaching Skills Training Program (Parsons et al., 1993) to train special education paraprofessionals on one targeted teaching skill, the use of hand under hand instruction. The researcher also sought to build the literature base on the effectiveness of the hand under hand strategy through student behavioral responses to the implementation of the strategy in place of hand over hand instruction.

### **Research Questions**

- What effect will the use of the Teaching Skills Training Program have on paraprofessionals' use of the hand under hand teaching strategy?
- To what extent will the Teaching Skills Training Program and the hand under hand teaching strategy be viewed as socially acceptable by paraprofessionals?
- What effect will the implementation of the hand under hand teaching strategy have on student involvement and participation during an adult led classroom task?

## CHAPTER 2

### REVIEW OF THE LITERATURE

Children who have a diagnosed visual impairment require specialized instruction from a TVI provided through direct instruction to the student, as well as indirect support for the special educators, paraprofessionals, and therapists working with the child.

Children who have other impairments in addition to their visual impairment are at a greater disadvantage than their peers who have a single diagnosis of visual impairment. TVIs, however, are unable to provide adequate instruction to meet the specialized needs of this population due to time restrictions (Wolffe et al. (2002), and this group of students who are visually impaired with additional disabilities therefore receive low amounts of specialized instruction from a TVI. Instruction then falls on special education teachers or paraprofessionals, who have little to no training and experience in meeting the needs of students with visual impairments through appropriate teaching strategies and classroom accommodations.

This chapter presents the literature on the theoretical frameworks guiding this dissertation, content specific research, conceptual framework, and initial cycles of research. First, the connection between the sociocultural theory with an emphasis on Vygotsky's theories of the zone of proximal development (ZPD) and concept development is explored in relation to the unique needs of students with visual impairment in their overall success in the classroom. Next, the theory of sensemaking is presented. Finally, the chapter concludes with a review of the conceptual framework being utilized and the initial cycles of research used to inform this dissertation.

#### **Sociocultural Theory**

According to Frey (2018), learning theories have been established over time to describe how people acquire knowledge and make connections between the information

they receive about the world around them. Learning begins in infancy through active participation in learning experiences. Children are attending to and learning about language, numbers, attributes, and properties of items in their environment, without any formal instruction, a phenomenon referred to as incidental learning in the field of visual impairments and blindness—learning that takes place just by being. Sociocultural theory is just one of many learning theories that describe how individuals acquire knowledge and develop meaning of the world they live in (Frey, 2018).

Vygotsky has been widely recognized for developing a sociocultural approach to cognitive development (Frey, 2018; John-Steiner & Mahn, 1998; Mahn, 1999; Shabani et al., 2010). Sociocultural approaches to learning and development are based on the ideas that “human activities take place in cultural contexts, are mediated by language and other symbol systems, and can be best understood when investigated in their historical development” (John-Steiner & Mahn, 1998, p. 191). According to the work of Vygotsky, language within the social environment is crucial to cognitive development, and learning is rooted in the context where the experience takes place (Frey, 2018). The sociocultural approach makes a distinction from other learning theories in the role that social interactions play in cognitive development and learning.

Vygotsky’s research is relevant in both general and special education, centered around the relationship between learning and development (Mahn, 1999). Two of Vygotsky’s numerous theories are being utilized as a framework for this action research study due to their direct relationship and connection to the unique needs of students with visual impairments. Vygotsky’s theory of the zone of proximal development (ZPD) places an emphasis on the role of the more knowledgeable other, a need for active student involvement, and a need for instruction that is meaningful and individualized. Vygotsky’s theory on spontaneous concept development has an impact on the learning

and development of students with visual impairments. Through the framework of ZPD and spontaneous concept development, special education teachers and paraprofessionals can improve their ability to meet the unique needs of their students who have visual impairments during all learning activities, ensuring access and understanding of core curriculum.

### **Zone of Proximal Development**

Over the course of a 13-year career as an early childhood teacher for students with visual impairments, a personal teaching philosophy developed and was coined “Meet Me Where I Am.” Unbeknownst at the time, this philosophy was referring to Vygotsky’s theory of ZPD. Vygotsky defined ZPD as the difference between what a child can do and the potential for what they can do with guidance from a more capable adult (Vygotsky & Cole, 1981). The philosophy of meeting a child where they are does just that. It identifies and accepts what the student can demonstrate in any given moment, while simultaneously recognizing what they can be taught within their ability and readiness, or ZPD. Current level of development is measured by what a child can achieve on their own; we must also measure what they are able to achieve through guidance and instruction (Mahn, 1999).

ZPD is an examination between learning and development (John-Steiner & Mahn, 1998), with one of the main insights being that instruction and learning blaze the trail for development (Fani & Ghaemi, 2011). Learning is not happening solely through self-discovery or at the pace of the learner, it is taking place through social interactions and assistance from someone more knowledgeable than the learner (Silalahi, 2019). What Vygotsky was saying in his theory on ZPD is that for a child to reach their next stage of development, to develop beyond their current levels, direct instruction from someone more knowledgeable is required. In addition to instruction from a more

knowledgeable other, another key point is the idea that the learner needs to be involved in the learning and instruction process. These two key concepts of ZPD will be discussed individually as they provide the foundational framework for this study.

### ***Role of More Knowledgeable Other***

Vygotsky believed that learning and development were a social process taking place through adult-child interactions. In his work, he described the difference between what a learner can achieve on his own, and what he can accomplish through the help of a “more knowledgeable other” (Frey, 2018). The idea behind this concept is that learning is better established when facilitated through collaboration between a learner and a more skilled person (Shabani et al., 2010). Through these interactions, the learner is then able to internalize new concepts and develop new skills (Shabani et al., 2010). As a framework, ZPD offers a method for addressing both learning and development, with research highlighting how an instructor can engage with a student (Frey, 2018), recognizing the power of these interactions. Through support and intervention by a more knowledgeable other and active involvement from the child, learning and development arise.

### ***Active Involvement and Participation***

The idea of active involvement or student participation is a central theme in the literature on ZPD. "In classroom learning, the student plays an active role and constantly informs the teacher as their mutual negotiation and collaboration build knowledge" (John-Steiner & Mahn, 1998. p. 197). This idea places the child as a key actor in his learning and development, requiring that he be actively, rather than passively, engaged in the learning process with guidance being provided by a more knowledgeable other. Shabani et al. (2010) described the main idea of ZPD as a process in which individuals learn best when provided with opportunities to participate through joint collaboration;



collaborative efforts with a more skilled person provide opportunities for the learner to internalize new concepts. When learning a new skill, the child and the adult need to work together, “participation is the key to cooperation” (Silalahi, p., 2019, p. 178) and the internalization of new ideas.

### **Theory of Concept Development**

In his discussion of concept development, Vygotsky wrote about spontaneous and scientific or nonspontaneous conceptual development (Mahn, 1999). He referred to meanings a child can make on their own as “spontaneous” (Clarà, 2017). These are meanings that are developed and created through natural interactions with the world in which a child lives and participates. According to Vygotsky, meanings that require instruction are referred to as “nonspontaneous” and he believed that in most stages of development there are opportunities for nonspontaneous learning (Clarà, 2017). Nonspontaneous concept development occurs when learning is taking place through facilitation of a more experienced person within a child's ZPD.

Clarà (2017) describes Vygotsky's system of generality as how concepts are generalized by a learner and involved in the formation of meaning. In each ontogenetic stage of development, meanings are formed differently, as explained by Vygotsky's law of unity and structure and function of thinking (Clarà, 2017). Concept development goes through stages, building and connecting to advance understanding and meaning. This theory on concept development is critical as it relates to children with visual impairments and the specialized instruction required to ensure complete conceptual understanding is developed.

### **Sociocultural Theory: Connection to Literature**

A sociocultural approach to education places an emphasis on the role of the social constructs of learning, and the role others play in the learning process. Learning through

the support of others is essential for all children, but even more so for a child with a visual impairment. Students with visual impairments have a unique set of learning needs due to their inability to learn spontaneously like their sighted peers. Vygotsky explained that spontaneous learning builds the foundation for non-spontaneous learning or learning that is directed by adults. The following section presents the expanded core curriculum (ECC), and the use of hand under hand instruction as one strategy for teaching concepts while promoting active involvement by the student. The section concludes with the theory of sensemaking, and the need for intentional training for those working with students who have visual impairments and blindness.

### **Expanded Core Curriculum**

The ECC is a disability specific curriculum outlining the skills that are necessary for students who are blind or who have low vision to be ready for their adult life (Texas ECC Committee, 2014). The ECC consists of nine areas in which children who have visual impairments require direct instruction to develop at a similar rate as their sighted peers (Lewis & Allman, 2014). These nine areas of instruction include assistive technology including access to communication, career education, compensatory skills including any skills necessary to access curriculum, independent living skills, orientation and mobility (O&M), recreation and leisure, self-determination, sensory efficiency, and social interaction (Allman & Lewis, 2014; Huebner et al., 2004; Texas ECC Committee, 2014) and are defined in table 2.

#### **Table 2**

*The Nine Areas of the Expanded Core Curriculum (ECC)*

ECC Area	Definition
Assistive technology	“the knowledge and skills that are essential to learning how to use technology to access all aspects of daily

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	living, whether at school, at work, at play, or at rest” (p. 187)
Career education	“components of activities and behaviors and skills needed to prepare students for all the roles they will play throughout their lives, including maintenance of economic independence in adult life” (p. 24)
Compensatory skills	“skills that must be learned in order for students with visual impairments to have access to information about the world, to be able to communicate, and to be literate and thus be successful in school” (p. 18)
Independent living skills	“behaviors and skills involved in managing daily demands of everyday life and maintaining one’s living environments” (p. 22)
Orientation and mobility (O&M)	“learning to orient to “their surroundings and to move as independently and safely as possible in familiar and unfamiliar settings” (p. 21)
Recreation and leisure	“the development of interests and skills involved in physical and leisure activities” (p. 24)
Self-determination	“the ability for of a child to advocate for his or her own needs and desires and to make independent choices about personal preferences and goals in life” (p. 26)
Sensory efficiency	“involves the effective use of input derived from the sense” (p. 19)
Social Interaction	“involves skills needed to “participate in social situations appropriately and to prevent social isolation” (p. 23)

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Retrieved from Allman & Lewis (2014). A strong foundation: The importance of the expanded core curriculum. In Allman & Lewis (eds.), *ECC essentials: Teaching the expanded core curriculum to students with visual impairments*. (pp. 15-30). AFB Press.

The inability to learn incidentally has an important negative influence on all other areas of development, including academic success, which led to the development of the ECC. Huebner et al. (2004) highlights the need for instruction to be provided in all areas of the ECC by a TVI. It is the responsibility of a TVI to support access to all academic work, as well as monitor progress and teach necessary skills in all areas of the ECC to ensure a high quality of life and highest possible levels of independence for students. The argument is made here that the ECC is a critical component of the education of students with visual impairments but is not always the focus of instruction delivered by TVIs. First a study that examined parent and professionals’ awareness of the

importance of the ECC will be reviewed, followed by a study conducted to capture what TVIs are teaching.

### **Hand Under Hand Instruction**

Hand under hand instruction is a widely used and accepted method for providing instruction or modeling to a learner with a visual impairment or who is deafblind. The strategy is designed to replace hand over hand instruction by inviting a child to join the instructor as they complete a task or activity. The instructor's hands are positioned under the hands of the child, with the child's hands resting on top (Lewis & Allman, 2014; Sacks, 2016). The method of an adult placing their hands under the hands of the learner provides an opportunity to demonstrate what the hands are doing (Sacks, 2016) and offers the learner greater control of the situation (Lewis & Allman, 2014). This method of instruction not only demonstrates respect for the learner, but it also encourages spontaneous and active participation by the learner.

As mentioned in chapter one, hand under hand is a widely used and accepted teaching strategy within the field of visual impairments and deafblindness. The literature however is limited to white papers, and professionals encouraging the use of the strategy for students who are deafblind. Limited data is available to support or negate the effectiveness of the hand under hand strategy. The use of hand under hand as a teaching strategy and method for providing instruction in all areas of the ECC to learners who are visually impaired aligns with four of the 22 HLPs. The robust HLP category of instruction includes 12 practices, four of which stand out as opportunities for educators to implement hand under hand instruction as a strategy when working with students who have visual impairments and include: provide scaffolding supports, use explicit instruction, use strategies to promote active student engagement, and provide intensive instruction.

### ***HLP15: Provide Scaffolding Supports***

“Scaffolding supports provide temporary assistance to students so they can successfully complete tasks that they cannot yet do independently and with a high rate of success (CEC 2017, p. 23). The provision of scaffolding supports is specified as the selection of powerful visual, verbal, and written supports (CEC, 2017) and would include tactile supports for students who have visual impairments. Through the provision of hand under hand instruction, an educator can scaffold the teaching for students with visual impairment, teaching them skills and activities they can’t yet complete independently and can’t learn through visual modeling. Providing scaffolding supports in this manner creates a learning environment in which the educator can slowly release (as defined in the glossary) by removing supports as they are no longer needed. Scaffolding supports are described as being either planned in advance or provided responsively during the course of instruction (CEC, 2017). Hand under hand is a strategy that can be provided in that same manner and phased out quickly and easily as a student acquires additional skills and knowledge.

### ***HLP16: Use Explicit Instruction***

The provision of explicit instruction requires that a teacher “make content, skills, and concepts explicit by showing and telling students what to do or think while solving problems, enacting strategies, completing tasks, and classifying concepts (CEC, 2017, p. 23). When working with students who have visual impairments, we know that they require direct hands-on learning opportunities to gain meaning about concepts being taught or explored. Hand under hand instruction provides an avenue for providing explicit instruction in all areas of the ECC and building concepts and learning necessary for future independence.

### ***HLP18: Use Strategies to Promote Active Student Engagement***

The active engagement of students is “critical to academic success” (CEC, 2017, p. 24). Hand under hand is a strategy that promotes active student participation in learning tasks and activities. When hand under hand is used properly, it encourages authentic participation and students who are choosing to participate in a learning opportunity. HLP18 describes the necessity for teachers to build a positive student-teacher relationship to “foster engagement and motivate reluctant learners” (CEC, 2017, p. 24). Hand under hand is a strategy that communicates respect and builds the trust that is necessary to foster engagement and active learning. Over time, even the most resistant learners will feel safe to initiate interactions when hand under hand is used a teaching strategy. Through hand under hand instruction students are invited to join an activity at their individual level of readiness.

### ***HLP20: Provide Intensive Instruction***

Providing intensive instruction requires that “teachers match the intensity of instruction to the intensity of the student’s learning and behavioral challenges (CEC, 2017, p. 25). Intensive instruction is described as working with small groups of students, grouping students based on needs, identifying clear learning goals, and using explicit well-paced instruction (CEC, 2017). When hand under hand is implemented properly, it offers an avenue for intensive instruction for students who have visual impairments or other developmental disabilities. Through hand under hand, educators can provide intensive instruction to these learners in all areas of the ECC in addition to their academic content.

### **Perceived Importance of the ECC**

Lohmeier et al. (2009) conducted a study to determine the level of understanding parents and professionals had on the “ECC content areas, the degrees to which they

value the ECC, and the ways in which they or their children's teachers are implementing the ECC content areas" (p. 106). The research design included separate surveys for parents and professionals, each consisting of two sections with questions designed to obtain information on general demographics, participant understanding of the ECC, how they value the ECC, and implementation of the ECC. The surveys were distributed nationally through direct distribution at conferences, email correspondence, availability on websites, and so forth. A total of 90 surveys were returned, 40 parent surveys and 50 professionals' surveys with responses from 14 different states.

What Lohmeier et al. (2009) found was that parents were under-informed about the ECC, and that although professionals understood the importance of the ECC, they were unable to teach within all nine areas of the ECC. The parent survey included questions about their perception of teacher knowledge and actual teaching of the ECC. They found that 45% of parents believed that their child had not been evaluated in the ECC content areas and 37.5% thought that their children were not receiving appropriate instruction in the ECC. The survey provided to professionals examined teacher preparation and limitations to instruction in the ECC. Of the responses from professionals, 57% reported that they did not have adequate time to teach skills outlined in the ECC. The areas of the ECC that were rated as more likely to be taught by the professionals who responded to the survey included technology at 22%, social skills at 12%, and orientation and mobility at 10.8% (Lohmeier et al., 2009). TVIs communicate an understanding of the importance and need for teaching the skills outlined in the ECC but find them difficult to implement. They know what they should be teaching, but they simply do not have enough time. That leaves the question, what do TVIs spend time teaching?

## **What are TVIs teaching?**

Wolffe et al. (2002) posed a question about whether “competent teachers of students with visual impairments teach that which is deemed necessary for students to become confident, independent, and employable young adults” (p. 295). Through an observational study including 18 certified TVIs from 6 states, Wolffe et al. (2002) looked more closely at what TVIs were teaching. The teachers observed ranged in experience from 3-25 years and in the type of educational setting they worked. The authors created and utilized a structured observation instrument allowing them to examine the frequency and type of instructional activities delivered by the teacher. Their findings indicated that TVIs spent most of their time on academics, communication skills, and tutoring and that TVIs were not providing high quantities or quality instruction in the disability specific curriculum the field knows to be essential.

An additional finding from the Wolffe et al. (2002) study is that 8% of TVI time was observed in collaboration with general education teachers and related service providers. Several activities were coded for consultation, including items such as setting up meetings, discussing progress, parent phone calls, and note writing. What was not specified in the study was how much time was spent on materials preparation or collaboration and training on how to teach disability specific skills. If TVIs are spending most of their time teaching academic content and their instruction in the ECC is limited to only the skills necessary to access academics, who is supporting the overall development of students?

## **Discussion**

Vygotsky’s ZPD states that development and learning take place through guidance from a more knowledgeable other (Vygotsky & Cole, 1981). That guidance requires active participation from the child and an opportunity to imitate what they have



learned. For students with visual impairments, this more knowledgeable other is a TVI, the person trained in understanding the unique needs of this population of students. The TVI understands *how* to provide instruction in a way that is meaningful. Learners who are visually impaired require active participation in all areas of the ECC through hands-on learning opportunities; they require direct instruction from a person who is most knowledgeable about their unique needs. In consideration of a student's ZPD and their unique needs as learners who are visually impaired, research has demonstrated what these students need. The problem arises, however, in what they actually receive, given their limited contact with TVIs. For students who have visual impairments and additional disabilities, the role of more knowledgeable other should be released to the special education teachers and paraprofessionals who have more opportunities to provide instruction. When provided with direct support, training, and on-going 1:1 coaching from a TVI, these professionals can fill the gap in instruction. Strategies to support this sharing of knowledge are the basis for the final theory guiding this dissertation, the theory of sensemaking.

### **Sensemaking**

Sensemaking can be traced back to the beginning of the twentieth century in the organizational literature, then emerged in the late 1960's as a distinct topic of study (Maitlis & Christianson, 2014). The 1990's literature and research base broadened the various aspects of sensemaking (Maitlis & Christianson, 2014). An important advancement in the field was Weick's (1995) influential text, *Sensemaking in Organizations*, which summarized the relevant research to that point and offered a broader understanding of the theoretical framework that is sensemaking (Maitlis & Christianson, 2014). Some researchers have described sensemaking as a theory, or perspective, while Weick described sensemaking as "a developing set of ideas with

explanatory possibilities, rather than a body of knowledge” (p. xi). Defined literally, sensemaking means the making of sense (Weick, 1995). The study of sensemaking looks at how people construct, what they construct, why, and with what effects (Weick, 1995). The sensemaking perspective, as it will be referred to in this dissertation, looks beyond how people construct meaning, extending to how they choose to act in response to the meaning derived.

Weick et al. (2005) explained that the process of making sense of an experience first involves noticing and bracketing of the information. This process involves the labeling and categorizing of the experience to then organize and find a common ground (Weick et al., 2005). During the process of making sense, the sensemaker is pulling from previous experiences to help interpret and make sense of the current experience; they can then use that information to decide what action is necessary.

The sensemaking perspective is a social construct, influenced by a variety of social factors, which can include previous experiences, discussions with colleagues, and memories of previous students who might have similar characteristics. When creating meaning of an event or an experience, Wong (2019) describes the process as drawing from a previous experience and “well of knowledge.” When thinking about and working with the idea of sensemaking, all aspects of a person’s previous experience are influential, no matter how big or small. The idea of sensemaking requires that we “appreciate that smallness does not equate with insignificance. Small structures and short moments can have large consequences’ (Weick et al., 2005, p. 410). The process of making sense involves the sensegiver, an experience or person offering information, and the sensemaker, the person receiving any form of information. A third construct is the idea of unintentional sensegiving, which refers to giving sense in ways that were not intended (Wong, 2019).

Sensemaking relies on the connections between current knowledge and previous knowledge. Similarly, the process of sensegiving draws on existing knowledge and influences other people's ability to make sense (Wong, 2019). Wong (2019) introduced the idea of unintentional sensegiving, explaining how a leader's existing knowledge can cause distribution of information to lead to giving of information in unintentional ways. The provision of information in unintentional ways can directly affect how a person interprets the information (Wong, 2019), therefore affecting how they can proceed to act.

The perspective of sensemaking guided this study in how training and development was created and implemented. A focus is placed on the giving of meaning, the sensegiver, the receiving of information, the sensemaker, and the potential for unintentional sensegiving. When developing a training initiative, it is imperative to consider how these three concepts intersect to ensure that proper planning and implementation efforts are made. The Teaching Skills Training Program (Parsons et al., 1993) was utilized as the grounding conceptual framework for this dissertation because it offers a training process that accounts for multiple points of sensegiving and making, which could help to mitigate any potential points of unintentional sensegiving by the researcher/trainer.

Through the intentional training process described in chapter three, participants received instruction on one targeted teaching strategy, hand under hand instruction, which accounts for instruction provided in a meaningful way by a more knowledgeable other, active participation and involvement from the student, and a method to explore and gain conceptual understanding of their world. Sociocultural theory, with an emphasis on Vygotsky's ZPD and concept development, and the theory of sensemaking merge in this dissertation to meet the learning needs of both the adult and student participants.

## **Conceptual Framework**

For training to be effective, implementation needs to be thoughtful and intentional. Parsons et al. (1993) created the Teaching Skills Training Program to fill a need for efficient and more effective training of staff working with people with severe disabilities living in residential facilities. The original training program consisted of two components, a classroom-based instruction component and an in vivo monitoring and feedback portion, which showed positive results in the initial study conducted (Parsons et al., 1993). Four additional studies were reviewed that also utilized this training methodology to train professionals working with children and adults who had developmental disabilities (Parsons & Reid, 1995; Schepis et al., 2000; Schepis et al., 2001; Schepis et al., 2003).

Two original studies looked first at training direct service staff members working in an adult residential treatment facility to utilize basic teaching skills (Parson et al., 1993), and then to train supervisors to provide appropriate feedback to employees in the residential treatment program (Parsons & Reid, 1995). Three additional studies shifted the focus to early childhood settings. The first setting provided training to staff members working with students who had disabilities in a community-based preschool program (Schepis et al., 2000), the second and third trained staff working with students who had disabilities in an inclusive preschool program (Schepis et al., 2001; Schepis et al., 2003). Each study indicated positive results in participant implementation of target teaching skills.

Targeted teaching skills included verbal skills of least to most prompting and contingent reinforcement, (Parsons et al., 1993) physical skills of correct order of teaching, correct prompting, correct reinforcements, and appropriate error correction

techniques (Parsons et al., 1993; Schepis et al., 2000; Schepis et al., 2001), feedback skills (Parsons & Reid, 1995), and strategies to promote cooperative participation and play between a child with disabilities and a child without disabilities (Schepis et al., 2003). The studies situated in a preschool program also looked at child responses to interventions as a secondary measure for effectiveness in the teaching strategy (Schepis et al., 2000; Schepis et al., 2001; Schepis et al., 2003). Each study consisted of two main phases, classroom-based instruction followed by on-the-job monitoring with feedback (Parsons et al., 1993; Parsons & Reid, 1995; Schepis et al., 2000; Schepis et al., 2001; Schepis et al., 2003). The length of classroom-based instruction ranged from two four-hour sessions (Parsons et al., 1993) to 90 minutes (Schepis et al., 2003). One study included an additional phase, on-the-job training, in which participants were asked to demonstrate the correct teaching skill during role play scenarios (Schepis et al., 2001). For the final phase of each study, job monitoring with feedback, there was a feedback protocol established by Parsons and Reid (1995) that ranged from 8 components to four steps (Schepis et al., 2003).

Each of the five studies reported positive results, in both adult increased use of targeted teaching skills as well as in client/student performance when measured. Parsons et al. (1993) reported that the Teaching Skills Training program was effective in teaching both verbal and performance skills, and that clients made progress in the development of adaptive skills. The studies conducted in the preschool settings reported similar results: improvement in staff demonstration and implementation of targeted skills (Schepis et al., 2000; Schepis et al., 2001) and student improved skills (Schepis et al., 2000; Schepis et al., 2001; Schepis et al., 2003). Schepis et al. (2003) is the only study that looked exclusively at student behavior as a measure for effectiveness of staff training. No measures were taken on paraprofessional performance, only on the effects

on students' ability to play cooperatively in response to adult training on effective strategies in promoting cooperative play.

One additional finding was that the training process was well received by participants in the two studies that measured acceptability (Parsons et al., 1993; Schepis et al., 2000). Through these five studies, the Teaching Skills Training Program was demonstrated to be effective in training professionals working with students and clients with disabilities in various settings, and across different teaching strategies. The consistency in positive results across settings and skills, in student/client growth in skills acquisition, and in the positive feedback from participants suggests that this methodology offers a potential framework to utilize when training staff to implement targeted teaching strategies when working with students with visual impairments. For this reason, the Teaching Skills Training Program provided the foundation for initial cycles of research, and the conceptual framework guiding this dissertation.

### **Action Research**

Action research is “characterized as research that is done by teachers for themselves” (Mertler, 2019, p.6). Action research is a cyclical process in which a researcher identifies a problem or area of focus, collects data, analyzes that data, then develops a plan of action (Mertler, 2019). The reconnaissance phase of this action research study took place in the Fall of 2020. Interviews were conducted with three special education teachers to confirm the problem being addressed, that special education teachers and paraprofessionals require additional training and support on the unique needs of students with visual impairments. From there, an initial cycle of research was developed and implemented, with those results used to inform the methodology utilized in this dissertation.

## **Cycle 1**

This initial cycle of research took place in the spring of 2021 within the researcher's local context, a K-12 private school for children with developmental disabilities. The Teaching Skills Training Program (Parsons et al., 1993) was used as the guiding conceptual framework and was implemented through a concurrent mixed methods design to train special educators in using the targeted teaching strategy of hand under hand. The Teaching Skills Training Program was implemented through the initial collection of baseline data on participants' use of hand under hand or hand over hand for physical assistance, provision of classroom-based training including role playing, on-the-job monitoring and feedback, and post-intervention data collection. Survey data were collected throughout the study to evaluate the acceptability of the training process to better inform future cycles of research.

The results of the quantitative data of this initial cycle suggested that the Teaching Skills Training Program had a positive influence on teacher and paraprofessional use of the hand under hand teaching strategy. The study included two participants, each of whom increased use of the targeted skill. Quantitative and qualitative data were synthesized to evaluate the effectiveness of the Teaching Skills Training Program. Effectiveness was defined as an increased use of targeted teaching strategy by each participant, positive experiences throughout the training process by all participants and the researcher, and manageable time commitment from the researcher. The analysis suggested that this training method was effective; each participant increased their use of the targeted skill, the time commitment was reported to be manageable by the researcher, and all participants reported positive feelings about the process as outlined in the qualitative data analysis. The findings of this initial cycle of

research were used to inform and develop the methodologies guiding this dissertation and develop three research questions being explored:

- What effect will the use of the Teaching Skills Training Program have on paraprofessionals' use of the hand under hand teaching strategy?
- To what extent will the Teaching Skills Training Program and the hand under hand teaching strategy be viewed as socially acceptable by paraprofessionals?
- What effect will the implementation of the hand under hand teaching strategy have on student involvement and participation during an adult led classroom task?



## CHAPTER 3

### METHODS

This action research dissertation utilized a mixed methods single case multiple baselines approach across three participant pairs. The mixed methods action research methodology is designed to produce well-validated conclusions with the interpretation of the results taking place during the study's final stage (Ivankova, 2015). Mixed-methods research designs are frequently used when the researcher believes that the combination of quantitative and qualitative results will lead to a complete understanding of the problem being addressed (Creswell & Guetterman, 2019).

In single case designs, one intervention is used with several participants, allowing researchers to examine effects of the intervention among participants (Emerson, 2020). Single case designs are useful in fields of social sciences for which the prevalence of a disability group might be difficult to study with many participants (Odom et al., 2005), which is the case for the low incidence population of students with visual disabilities. A multiple baseline approach across participants is one of the most used variations of a multiple baseline research design, allowing the independent variable to be introduced sequentially across several individuals exhibiting similar characteristics (Gast & Ledford, 2018). Participants for this study consisted of one staff member and one student from three different classrooms within the local context.

To meet the criteria of a multiple baseline study, baseline data for the participants in each classroom began simultaneously, with the intervention implemented in one classroom at a time while baseline data collection continued for each of the other participants. The intervention was then staggered to each of the remaining participants until each paraprofessional received the full intervention. The staggered start of the intervention allowed for reliability in the data to ensure that the intervention was

associated with change in behavior rather than some other variable. The timeline for implementation including the number of data collection sessions that occurred for each participant pair at each phase of the intervention is captured in Table 3.

**Table 3**

*Timeline for Implementation*

	Baseline	Observation	Post Intervention	Maintenance
Participant Pair 1	3	3	15	4
Participant Pair 2	8	3	5	4
Participant Pair 3	10	3	4	4

**Context and Participants**

This study took place at ACCEL, a private school for students with developmental disabilities, in the spring of 2023. At the time of the study, the researcher had been in the role of ACCEL’s full time TVI for three years and had built a relationship with adult and student participants. Staff members and students were recruited from three separate classrooms on one of ACCEL’s campuses. The staff to student ratio in each classroom was 2:1, with additional support provided as needed to meet the individual needs of each student. In addition to a special education teacher and paraprofessionals, each of these classrooms received support from a speech language pathologist, occupational therapist, physical therapist, and a TVI. ACCEL operates with an interdisciplinary approach to instruction, with each discipline working collaboratively to provide appropriate instruction to students attending the program, making this context ideal for the study that was conducted.

## **Context**

ACCEL follows a structured classroom routine that is consistent among classrooms and campuses with some variation to meet individual student needs. Each class participates in large group, small group, and 1:1 instruction throughout the course of the school day. Consistency across classrooms helped ensure a higher level of validity in the findings of this study. Paraprofessionals participating in this study were monitored during 1:1 teaching time, referred to as tasking, which is explained further below. One paraprofessional and one student participant were recruited from three separate classrooms at the ACCEL Phoenix campus, creating what is referred to as participant pairs.

## ***Tasking***

During the structured teaching time of tasking, each of the adults in the classroom work 1:1 with students on focused tasks aligned with IEP goals. The students typically rotate between 3-7 different activities, each lasting 3-5 minutes, for a work cycle lasting approximately 20 minutes. This classroom routine has been targeted as a point for the intervention for numerous reasons. First, tasking occurs regularly as part of most classroom routines, allowing for consistency across classrooms. This routine also happens at roughly the same time each day, making planning for intervention less complicated, again leading to consistency among classrooms. Third, the tasking routine involves the completion of multiple activities in which students may require physical assistance, support, or prompting. The potential need for a high level of physical assistance made tasking an optimal time to practice the targeted teaching strategy while engaging in different activities.

## **Participants**

This study consisted of a combination of adult and student participation. All participants were recruited from the local context and included staff members and students who had a pre-established relationship with the researcher. All participants agreed to participate in the study and were informed of their right to choose to leave the study at any time. Consent for student participation was provided by a consenting parent or caregiver, and through student informed consent prior to each data collection session. To maintain confidentiality, all participants have been given a pseudonym that they will be referred to throughout the remainder of this dissertation.

### ***Paraprofessionals***

Paraprofessionals were recruited from within the local context of this action research study. A total of three paraprofessionals were selected from three separate classrooms within the local context. One paraprofessional from each of the participating classrooms was invited to participate based on their interest in participation and their level of experience with the targeted teaching skill of hand under hand instruction. Inclusion criteria for paraprofessionals was limited to those paraprofessionals who had not received any formal training on the use of the hand under hand teaching strategy within the last year, had no 1:1 coaching on the proper use of the hand under hand teaching strategy, and who had daily access to a minimum of one student with a visual impairment meeting inclusion criterion outlined below.

**Paraprofessional One: Diane.** At the time of the study, Diane reported that she had been working at ACCEL for 1-2 years. She reported that she had been working with students who have disabilities for 1-2 years and has had experience working with 1-5 students who have visual impairments. Diane reported that she had no previous training on strategies that are best when working with students who have visual

impairments but felt confident in her ability to teach and work with these students. Following classroom-based training, each paraprofessional was asked whether they had previous instruction in the hand under hand teaching strategy, which she had not. Diane is a paraprofessional who is supervised by a teacher who participated in the initial cycle of research and uses hand under hand instruction exclusively in her classroom. While Diane did not have any formal training on the strategy, she did come to the study with some background awareness and exposure.

**Paraprofessional Two: Jamie.** At the time of the study Jamie was in her first year working at ACCEL, with this year being her first time working with students who had disabilities. Although the classroom that Jamie was assigned to consisted of two students with visual impairments, she reported that she was not aware of any experience working with visually impaired students. Prior to this study, Jamie had no exposure to or training in the hand under hand teaching strategy.

**Paraprofessional Three: Leslie.** At the time of the study Leslie had the longest career at ACCEL, 6-10 years, and reported having experience working with many students who have disabilities. Leslie reported that she had worked with more than 20 students who have visual impairments. Leslie couldn't remember any training or coaching she had received on strategies that worked well for students who were visually impaired, but she did report feeling confident working with this group of students. Leslie did have some previous training on the hand under hand teaching strategy, which occurred more than a year prior to the start of this study. At that time Leslie participated in a classroom-based training provided by the researcher to a group of approximately 20 participants.

### ***Student Participants***

Students were recruited to participate in this study as a method for validating the effectiveness of the targeted teaching strategy of hand under hand instruction. One student was recruited from each of the participating classrooms. For students to participate in this study, they were required to have a diagnosed visual impairment, co-occurring disabilities (any diagnosed disability in addition to their visual impairment), and no limitations on the use of their upper extremities. The students were not required to have visual impairment identified as a special education eligibility category.

The hand under hand teaching strategy requires a student to reach out to engage or join an adult, making this strategy more challenging if a student has a limited range of motion in their arms and hands. Use of the hand under hand teaching strategy is possible with students who have limited coordination and control of their upper extremities; it just requires a higher degree of confidence in the implementation of the strategy and in reading the students cues. For this reason, use of hand under hand with students who demonstrated reduced use of their arms and hands was considered an advanced skill, and therefore not appropriate for an adult just learning the teaching strategy.

**Student Participant One: Claire.** Claire is a 12th grade student who is eligible as a student in special education under the eligibility categories of multiple disabilities with a severe sensory impairment, visual impairment, and severe intellectual disability. Claire has a diagnosed cortical visual impairment and exotropia; she is ambulatory and prefers to move around the classroom. Claire has a diagnosis of mitochondrial disease. Claire's acuity is identified as fixates and follows briefly, she prefers looking at materials in her peripheral fields, and her vision does not appear to extend beyond about 5 feet.

Claire's primary method of communication is through body language, gestures, and vocalizations. Claire receives direct instruction and support at school from a special education teacher, physical therapist, occupational therapist, speech language pathologist, and a TVI. She has full use of her upper extremities and is often resistant to instruction, which is demonstrated through aggressive behaviors and throwing/ripping of the materials being presented. Claire enjoys walking around, going to the playground, giving hugs, and getting back scratches.

**Student Participant Two: James.** James is an 8th grade student who is eligible as a student in special education under the eligibility categories of autism, moderate intellectual disability, and speech language impairment. Although James does not have an eligibility category of visual impairment, he does have a diagnosis of amblyopia, esotropia, nystagmus, and torticollis, which met the inclusion criteria, and has received vision therapy in the past. James' acuity is listed as fixates and follows and he does not appear to have any field preferences or restrictions. In addition to his visual impairment, James has a diagnosis of autism.

James is ambulatory and prefers to sit quietly at the side of the classroom. James is primarily a verbal communicator, although his communication is limited to routine and rote phrases. James receives direct instruction and support at school from a special education teacher, occupational therapist, and speech language pathologist. James has full use of his upper extremities and a high level of independence in fine motor tasks. James does get frustrated and will refuse to complete fine motor activities that are too challenging. James enjoys going for walks and writing activities.

**Student Participant Three: Kevin.** Kevin is a 9th grade student who is eligible as a student in special education under the eligibility categories of multiple disabilities with severe sensory impairment, visual impairment, and severe intellectual

disability. Kevin has a diagnosed cortical visual impairment; he is ambulatory and moves very quickly through the classroom and school campus. Kevin prefers looking at materials in his peripheral visual fields and has a reported visual acuity using Teller Acuity cards, of 20/94. Kevin's vision is limited to near distance, within 5 feet.

Kevin's primary method of communication is through body language, gestures, and vocalizations. Kevin receives direct instruction and support at school from a special education teacher, physical therapist, occupational therapist, speech language pathologist, and a TVI. He makes full use of his upper extremities and is often resistant to instruction, which is evident through vocalizations, crying, rocking, biting himself, and trying to leave the area. Kevin's preferred pastime is listening to music, specifically 90's R&B or Mariah Carey.

### **Role of Researcher**

In the local context of this dissertation, the researcher is situated as a participatory action researcher. At the time of this dissertation, the researcher worked at the school within the participating classrooms as a TVI and direct service provider to all student participants and support personnel to the paraprofessionals. In the local context, the researcher is viewed as an expert in the field of visual impairments, and worked closely and regularly with each student participant, providing direct 1:1 service as identified in their IEPs. During the intervention period, the provision of regular direct service to student participants, in addition to any other student in the classroom who had a visual impairment was maintained. The researcher created all training materials, data collection tools and procedures, and implemented each phase of the intervention described below.

For this dissertation, the researcher was the sole personnel conducting the study. An outside rater was recruited to provide interrater reliability in data analysis and



fidelity checks. The role of the outside rater is explained in more detail at the end of this chapter in the analysis section and is referenced throughout the chapter.

### **Intervention**

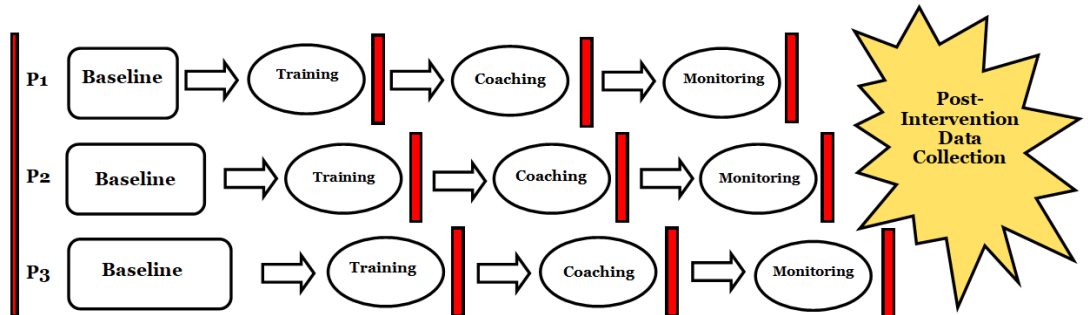
This study consisted of a multiple baselines approach across three participant pairs. The three paraprofessionals participated in a training package modeled after the Teaching Skills Training Program (TSTP) originally designed by Parsons et al. (1993). The TSTP was modified and implemented to train each of the three paraprofessionals to use a new teaching strategy, hand under hand instruction. The effectiveness of the training process and student performance when the new teaching strategy is used in place of the existing strategy of hand over hand guidance were then evaluated.

The original training program consisted of three components: classroom-based instruction, on-the-job monitoring and feedback, and supervision and maintenance (Parsons et al., 1993). After careful review of each study that used the TSTP and the individual methodologies utilized, this study followed the two consistent steps of the TSTP, with an additional step of on-the-job coaching that took place before monitoring and feedback.

Baseline data were collected on each participant prior to the implementation of the training package. Following baseline data collection, paraprofessionals received the training package, which included a 90-minute classroom-based training session, followed by one day of individual practice and one day of on-the-job coaching. Once the training package was delivered to the paraprofessionals, they each received three sessions of on-the-job monitoring and feedback prior to the post intervention data collection. Upon completion of post intervention data collection, each participant had a two-week break before four sessions of maintenance data were collected. The structure of this study is outlined in Figure 1 and described in more detail below.

**Figure 1**

*Intervention Implementation Structure*



*Note.* Training refers to classroom-based training, coaching refers to on-the-job coaching, and monitoring refers to on-the-job monitoring with feedback. Red lines indicate points of survey administration; the initial survey prior to baseline collected demographic information.

**Training Package**

The training package consisted of three components: a 90-minute classroom-based training session, one day of individual practice, and then one session of on-the-job-coaching. The day of individual practice is not shown in the figure above and was included to allow time for each participant to practice the new teaching strategy with their student participant prior to on-the-job coaching so that they could come to the coaching sessions prepared with questions that occurred during initial implementation with their student. The details of the classroom based training and on-the-job coaching portions of the training package are described below.

***Classroom Based Training***

Classroom-based training with role playing was the first component of the training package and the initial step in the intervention. This initial phase of the intervention was provided to the staff members of each classroom individually after

school on early release Wednesdays. Each week a new classroom team received training to ensure efficacy of the multiple baseline methodology. All staff members in participating classrooms received this phase of the intervention alongside their colleague/participant who was to participate in each of the subsequent phases. Classroom-based training included a simulation activity, lecture, video examples, role playing with coaching, and an opportunity for questions. Training lasted for 90 minutes with each classroom team.

**Simulation Activity.** Classroom-based training started with a simulation activity. Staff members participating in the training were asked to pair up. One member of each group was blindfolded, playing the role of student, and the other remained sighted, playing the role of teacher. Each “teacher” was offered materials for a fine motor activity that they were required to help their “student” complete. Once the teams completed the activity, roles were switched. Following the simulation, participants were asked to discuss their experiences in both roles. The purpose of this simulation activity was to offer a contrast to the later role play portion of the training.

**Lecture.** The simulation led to the lecture portion of the classroom-based training. During this time, staff members participating in the training received information on what the targeted teaching strategy, hand under hand is, and its use. Participants were taught how to use hand under hand when working with their students, including the mechanics of the strategy and examples of prompting that can be used to invite the student to join a hand under hand experience. The lecture concluded by offering the types of activities in which hand under hand can be a useful strategy to help engage and encourage student participation.

**Video Examples.** Hand under hand is a unique teaching strategy that is not widely used. For this reason, video examples of its proper use were shown to the

participants. Videos included different types of learners, as well as the strategy being used across a variety of activities.

**Role Playing with Coaching.** The last portion of the classroom-based training the participants were asked to practice using the hand under hand strategy with each other. Participants paired up again and were asked to role play, with one member of a pair being a “student” and the other being a “teacher.” They completed routine classroom activities that are familiar to the students they work with. Each participant had an opportunity to be a teacher and a student. The researcher/trainer participated through coaching and offering feedback to the participants. This portion of the classroom-based training continued until the study participant received a minimum of three rounds of feedback. After the completion of role-playing activities, conversation was open to questions about the strategy and next steps. The study participants were then released to move into the subsequent portions of the training package, while the rest of the training participants were asked to start using the hand under hand strategy in their regular practice with no further participation in the study.

### ***On-the-Job Coaching***

On-the-job coaching took place in the classroom with each paraprofessional while working 1:1 during the structured time of tasking with student participants. During this time, the researcher joined the paraprofessional and student to offer modeling, coaching, and specific feedback on the proper implementation of the hand under hand teaching strategy. Prior to the start of on-the-job coaching, each participant had one day following classroom-based training to practice and test out the use of hand under hand with students. This day of practice created an opportunity to develop specific questions and points of clarification. Each participant received one session of on-the-job coaching

before moving into the final phase of the intervention, on-the-job monitoring and feedback.

### ***On-the-Job Monitoring and Feedback***

Immediately following on-the-job coaching, the researcher shifted into the final phase of the intervention, on-the-job monitoring and feedback. During this final phase of the intervention, the researcher/trainer observed the paraprofessionals while working 1:1 with a student participant during the period of structured tasking. During this phase of the intervention, paraprofessionals were observed while working 1:1 with their students and then provided with immediate feedback that followed a structured 5 step feedback protocol outlined in Table 4. Feedback occurred immediately after the observation for paraprofessionals one and two, and at the end of the same school day for paraprofessional three. Feedback sessions took on average five minutes. Each paraprofessional received three sessions of observation and feedback and mastered the hand under hand strategy at over 80% accuracy upon completion of the observation cycle. Upon completion of the final on-the-job monitoring and feedback session, paraprofessionals were released to collect post intervention data.

**Table 4**

*Five Step Feedback Protocol*

Step	Feedback Provided
1.	Offer a positive or empathetic general statement about the teaching session
2.	Offer praise for identifying an opportunity to perform teaching skill correctly.
3.	Identify an opportunity in which the teaching skill may have been performed incorrectly and a description of how to correctly perform the targeted teaching skill.
4.	Offer an opportunity to ask questions regarding the feedback.
5.	End with a final positive or encouraging statement.

## Data Collection and Procedures

Mixed methods action research allows for the triangulation of qualitative and quantitative data to help answer the identified questions guiding a study. A mixed methods approach is often used when the combination of data sources will provide a deeper understanding of the problem being addressed (Clark & Creswell, 2014). For this action research dissertation, quantitative and qualitative data were collected concurrently, then analyzed individually. The individual results were then triangulated to inform the problem being studied. Each of the data collection instruments and procedures are described below, with Table 5 offering a breakdown of how data sources were triangulated to answer the three guiding research questions.

**Table 5**

*Alignment of Research Questions with Data Collection Instruments*

Data Instruments				
Research Questions	Video Recordings	Survey Data	Researcher Field Notes	Student Anecdotal Data
1.	Adult behavioral observations		Researcher perception of acceptability	
2.		Acceptability of training process and HUH	Researcher perceived acceptance of training process and HUH	
3.	Student behavioral observations	Perceived student behavioral response	Research perception of student response to intervention	Perception of student behavioral responses

*Note.* HUH refers to hand under hand instruction in this table only, in text it will continue to be written out.

## **Quantitative Procedures and Instruments**

Quantitative data were collected throughout the intervention to inform and help answer each of the three research questions. Quantitative data were collected through daily video recording of adult and student participants working 1:1 during the structured time of tasking and through Likert scale survey questions administered at structured points throughout the intervention. Video data were collected daily by each paraprofessional for five consecutive weeks with four additional data collection sessions taking place two weeks following the completion of post intervention data collection to serve as maintenance data. There was a two-day break of data collection during the training package; data were not collected during the one day of individual practice or during the one session of on-the-job coaching. The procedures used for video data collection, the instruments used to analyze the video footage, and finally the Likert survey questions developed to help answer research questions two and three are described as follows.

### ***Video Recordings***

Videos of participants were collected in the manner described here throughout the entire intervention, including during maintenance data collection. Video footage was collected daily from each participant pair and saved to a secure internal network each afternoon for the researcher to retrieve. A camera was placed in each classroom on a tripod in a position that captured the hands of both the adult and student, and the face and body of the student participant. Camera placement was critical for data analysis. For this reason, each paraprofessional was provided with clear instructions and training on how to position the camera so that the appropriate data were collected without compromising the integrity of the study. To ensure proper camera position on the first baseline session, participants were asked to record a session of 1:1 instruction during the

daily structured activity of tasking, which was reviewed before data collection began. At the baseline phase, participants were not aware of what teaching strategy was being evaluated, they only received instructions for timing of the recorded session and positioning of the camera for optimal future analysis.

Each data collection session lasted between 15-30 minutes and captured students engaging in 3-7 separate activities during the structured learning time called tasking. Sessions for participant pair one averaged 15 minutes and included an average of seven activities, the second participant pair had sessions that averaged 31 minutes and included an average of 4.5 activities, and the sessions of participant pair three averaged 17 minutes and included an average of four activities. The variation in length and number of activities was due to the individual needs of the students, and the speed that they worked. A breakdown of the activities included for each student is presented in Table 6. Each student had a set of activities, selected prior to the start of the intervention, that were familiar, worked toward individual IEP goals, and would require ample opportunities for physical assistance.

**Table 6**

*Activities Completed by Students*

Claire	James	Kevin
Inset puzzles	Beading	Use of name stamp
Pop beads	Buttoning	Identifying pictures
Coloring	Zippers	Pulling apart Velcro
Opening containers	Buckles	fruit
Ring stacker	Nuts and bolts	Putting items into a
Hammering activity		container



The data collected through video recordings were analyzed using a secure web-based video analysis software program called V-Note. Using V-Note, the researcher uploaded each of the video data collection sessions into the software, then analyzed each recording for all variables defined for both the adult and student behavior. V-Note also provided a platform to securely share footage with an outside rater to establish interrater reliability and was equipped with built-in features that facilitate interrater reliability. Below is the description of the specific features of V-Note used for data analysis of adult and student behaviors.

### ***V-Note***

V-Note is a secure web-based video analysis software program designed to analyze video footage. The developer of the V-Note software states that the program was designed for research, sports, teacher training, and legal work (V-note, 2014-2023). V-Note offers a robust set of features, with only a small portion utilized for this study. V-Note was used to code for adult and student behaviors. Interrater reliability and collaboration capabilities were available to ensure seamless and secure transferring of data between the researcher and an outside rater. Statistical features were also available to obtain quantitative data for each video that provided details on occurrences of each behavior being coded.

When analyzing video footage in V-Note, each recording was analyzed two times, first for adult use of physical assistance, and then again analyzing student response to that physical assistance. Each recording session was coded for a total of six behaviors: adults were coded for two behaviors, type of physical assistance (hand over hand or hand under hand), and students were coded for four behaviors: type of participation (active or passive) and type of involvement (willing or resistant). Behavioral definitions for these codes are described below.

## ***Adult Behavioral Coding***

During the initial viewing, recordings were analyzed for adult implementation of physical assistance through a trial-based approach. When using a trial-based approach to data collection, there must be a clear antecedent (Gast and Ledford, 2018) that triggers the behavior; in this case it was a student's need for physical assistance, in the form of hand over hand or hand under hand instruction. Each time physical assistance was offered, the evaluator coded the video for which type of assistance was provided, thereby identifying the total number of opportunities that were available for the use of the hand under hand strategy. The number of instances that hand under hand instruction were used out of the total opportunities available were then calculated. The functional behavioral definitions of the hand under hand and hand over hand strategies are listed in Table 7, followed by the coding rules established for consistency in Table 8.

**Table 7**

*Procedure Definitions for Hand Over and Hand Under Hand Support*

Behavior	Definition
Hand under hand (HUH)	The hand under hand teaching strategy is performed by an adult placing their hands under the hands of the child, with the child's hands resting on top (Lewis & Allman, 2014; Sacks, 2016). The method of an adult placing their hands under the hands of the learner provides an opportunity to demonstrate to the visually impaired student what the hands are doing (Sacks, 2016) and offers the learner greater control of the situation (Lewis & Allman, 2014).
Hand over hand (HOH)	Hand over hand instruction involves an adult taking and manipulating a student's hands to assist in completing a task (Lewis & Allman, 2014). When a well-meaning adult moves the students' hands through hand over hand instruction it situates the student as a passive learner, limiting their ability to gather tactile information ( Lewis & Allman, 2014).

**Table 8***Adult Behavioral Coding Rules*

Example	Code
Adult places their hands under the hands of the student	Hand under hand
Adult places their hands on top of the students' hands	Hand over hand instruction
One hand is using hand over hand, one hand is using hand under hand	Hand over hand: Code instance for most restrictive form of physical assistance observed
Adult taps under students' hand to invite them to join, then reaches forward to complete the task and the student does not join	No code: adult invited, student did not join therefore no assistance provided
Adult puts their hands under the hands of the student, then places a thumb over the top of the students' hand	Hand over hand: if the thumb grasp lasts longer than 3 seconds Hand under hand: if the thumb grasp lasts less than 3 seconds, as this is considered a cue to move with the adult

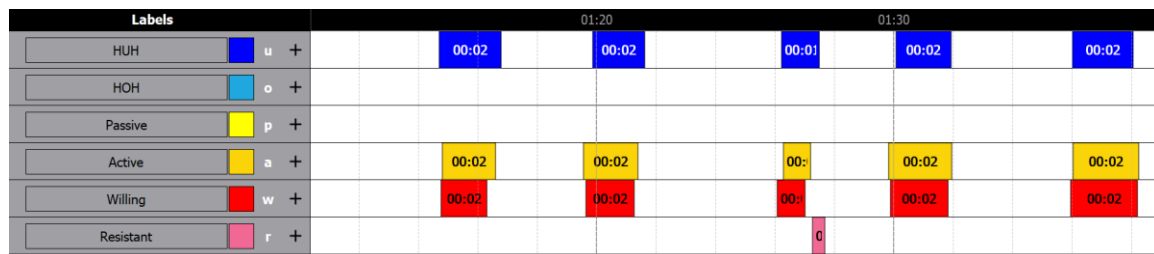
***Student Participant Behavioral Response***

Each recording was reviewed a second time through a trial-based approach. During this second viewing, observations were made on how the student responded to each instance of physical assistance, either hand under hand or hand over hand support. Student participants were analyzed for two separate variable pairs: type of involvement in the activity and then type of participation. Each of these variables were coded for two different behavioral responses. Behavioral responses to each of these variables were coded immediately following each instance of physical assistance. As soon as either hand over hand or hand under hand instruction was initiated by the adult, the antecedent, observations were made on how the student was involved and how they were

participating. Observations lasted throughout the entire duration of the instance of physical assistance. Figure 2 shows what the coding process looked like in the V-Note software to provide a clear understanding of how and when student behaviors were coded.

**Figure 2**

*V-Note Coding Example*



Student involvement in an adult-led classroom task was coded as either willing to be involved, or resistant to being involved with the activity immediately following each instance of physical assistance offered. The student’s type of participation in an adult-led classroom task was defined as either actively participating in the task or passively participating in the task immediately following the initiation of an instance of physical assistance. Behavioral examples used to guide the evaluation of behaviors and ensure interrater reliability in data collection are outlined below in Table 9.

**Table 9**

*Procedural Definitions for Student Behavioral Responses*

		Examples of observable behaviors
Type of involvement	Willing	<ul style="list-style-type: none"> <li>• Initiates the placement of hand on adult’s hand with or without prompting</li> <li>• Initiated HUH—when prompted, moves hand to be positioned on top of the adult’s hands</li> <li>• Joins adult</li> <li>• Keeps hand on top of an adult’s hands</li> <li>• Takes hand away—control, free to end</li> </ul>

Type of participation	Resistant /Refusal	<ul style="list-style-type: none"> <li>● Not helping with hand positioning</li> <li>● Stiff hands</li> <li>● Turning body away/leaning away</li> <li>● Looking around to other activities</li> <li>● Other forms of physical aggression: kicking of foot, biting, trying to pull away, verbalizing a lack of interest</li> </ul>
	Active	<ul style="list-style-type: none"> <li>● Appears engaged, demonstrated by: <ul style="list-style-type: none"> <li>○ looking at instructor or work</li> <li>○ maintaining contact</li> <li>○ self-initiation of task/or exploration of materials</li> <li>○ stilling head movements</li> <li>○ adjusting head placement to use optimal vision</li> </ul> </li> <li>● Places hand on adult's hand</li> <li>● Pulls hands away, but maintains contact with adult</li> </ul>
	Passive	<ul style="list-style-type: none"> <li>● Appears to be not engaged <ul style="list-style-type: none"> <li>○ Allows hand to fall off of adult's hand with no reaction</li> <li>○ Calm body, but not looking at work/adult</li> <li>○ Allows adult to manipulate hand with no observable aversion or active participation</li> <li>○ Continues self-stimulation, such as singing to self or moving of head side to side</li> </ul> </li> </ul>

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Profiles were created for each student participant outlining typical visual and behavioral responses to be used in the analysis of the recordings. Student profiles included a short paragraph describing the student's visual characteristics and typical behavioral responses and a video clip highlighting the student's typical behavioral responses. For the data analysis process, it was important to recognize the unique characteristics of each student prior to analyzing their behavior because similar behavioral responses could convey different meanings. For example, the observable behavior of looking away from a task could indicate passive participation for a student with low vision because they are not visually engaged with the task, but a student who is

totally blind could demonstrate the same observable behavior of looking away but be actively involved. These unique behavioral responses were teased out prior to the actual collection of behavioral data to ensure that each student's unique characteristics were understood and interpreted consistently during analysis.

### ***Social Validity Survey Data: Likert Scale Questions***

The social validity surveys were administered following each phase of the intervention and upon completion. Each survey consisted of Likert scale and open-ended questions measuring three separate constructs: acceptability of the training process, acceptability of the teaching strategy of hand under hand, and perceptions of student response to the new strategy. Each survey consisted of 6-12 Likert scale and open-ended questions. The surveys are included in Appendix A.

### ***Interrater Reliability***

Interrater reliability for adult and student behaviors was calculated using an outside rater. Interrater reliability is a method to check for agreement between two separate observers (Gast & Ledford, 2018). Gast and Ledford (2018) suggest that observers be trained through the provision of behavior definitions and non-definitions, practice coding with the researcher, and a discussion of discrepancies. An outside rater from the field of visual disabilities fulfilled this role. The outside rater was provided with training on behavioral definitions and student profiles. Coding was practiced together, then in isolation, with discrepancies discussed later.

The outside rater coded a minimum of 30% of all coded instances from 30% of all video recorded sessions. The V-note software was used to share 30% of all videos, and within those videos randomly share 30% of the instances that were originally coded by the researcher. For example, if the researcher coded 30 instances of physical assistance during a video, the outside rater would then code a randomly selected 10% of those

instances of physical assistance. The coding was blind in that the outside rater knew that an instance needed to be coded as one form of physical assistance (hand over hand or hand under hand), but she did not have any indication of how the researcher coded the same instance. Once completed, the V-note software provided an output of each coded instance and how the two raters rated each instance.

### **Qualitative Procedures and Instruments**

In mixed methods research, quantitative and qualitative data are collected and then triangulated to build a better understanding of the problem being evaluated. Qualitative data were collected alongside quantitative data throughout the study. Qualitative data were gathered through social validity surveys completed by paraprofessionals at designated points in the study, researcher field notes, and anecdotal observations made by evaluator on student behavioral responses.

#### ***Social Validity Survey Data: Open-Ended Questions***

The social validity surveys gathered both quantitative and qualitative data. Each survey included a set of Likert scale questions, and open-ended questions. The open-ended questions were designed to better understand paraprofessionals' experiences with the training process, teaching strategy, and perceptions of student performance. These questions aligned with each of the constructs being measured and defined above. Each survey consisted of 6-12 Likert scale and open-ended questions. The surveys are included in Appendix A.

#### ***Researcher Field Notes***

Field notes were collected throughout the duration of the intervention and included observations of adult and/or student participants and reflections on conversations with paraprofessionals and individuals who participated in the classroom-based training. As observations were made, field notes were typed out on a continuous

word document that was saved on a secure external storage device. The researcher's insider positionality created opportunities for observations to be made of paraprofessionals and students outside of the structured research study; providing a rich set of data to include in the analysis process.

### ***Anecdotal Observations of Student Behavioral Responses***

The third source of qualitative data were gathered through anecdotal accounts following the collection of student behavioral response data. After watching each video recording and collecting quantitative data on student behavioral responses, reflections were gathered through structured reflection questions on interpretations made of the student's response to the intervention. Reflections were aligned with each of the behaviors being measured for adults and students, in addition to general thoughts and observations. These anecdotal observations were analyzed at the completion of data collection and triangulated with the quantitative findings to support the overall conclusions discussed in the final chapter.

### **Procedural Fidelity**

Procedural fidelity in the training process was confirmed at three separate points by paraprofessionals, the researcher, and an outside rater described below. Each fidelity checklist can be found in Appendix B, C, and D.

#### ***Fidelity Check One: Classroom Based Training***

The first point of fidelity was assessed by the training participants, and an outside rater. Fidelity was checked on the structure of the classroom-based training consisting of 11 components. Each member involved in the training was asked to complete a short "exit ticket" prior to leaving the training asking them to confirm that the researcher completed each of the 11 steps as outlined in this dissertation. An outside rater also



watched a recording of the classroom-based training and completed the same checklist. The checklist used is provided in Appendix B.

### ***Fidelity Check Two: On-the-Job Coaching***

On-the-job coaching was provided to each participant following classroom-based training and one day of individual practice. To ensure that fidelity of implementation was documented for this phase of the intervention, each paraprofessional's supervising teacher signed off on the coaching session. Documentation included date and time the coaching occurred. Fidelity was checked for all three on-the-job coaching sessions. This fidelity check form can be found in Appendix C.

### ***Fidelity Check Three: On-the-Job Monitoring and Feedback***

The final point of fidelity in the intervention was checked during on-the-job monitoring with feedback. During this phase, the researcher observed the participant while they worked with their student participant, made observations on their use and implementation of hand under hand instruction in place of hand over hand instruction, and then offered feedback following the five-step protocol. Fidelity was collected at the point of feedback, using the five-step protocol as outlined earlier. Each feedback session was audio recorded, then transferred to a secure electronic database. All the recordings were then reviewed by an outside rater using the fidelity checklist outlined in Appendix D.

## **Data Analysis**

### **Quantitative Data**

Each video recording was analyzed for three variable pairs: paraprofessional's use of physical assistance (hand over hand or hand under hand), student's participation (active or passive) and student's type of involvement (willing or resistant). All data were then analyzed through descriptive statistics and graphed for visual analysis.

### ***Descriptive Statistics***

Descriptive statistics is the most common method for analyzing quantitative data in an action research study (Ivankova, 2015) and was utilized to determine the mean occurrence of each observable behavior. Through trial-based data collection on each observable behavior pair, the average occurrence of each behavior was calculated. When collecting data on adult's use of physical assistance, either hand over hand or hand under hand, the total number of instances that physical assistance was offered was determined and used to calculate the percentage of time each occurred. For example, if during one data collection session there were 12 instances of hand over hand instruction coded, and 13 instances of hand under hand instruction, there were 25 total opportunities of physical assistance, 48% hand over hand and 52% hand under hand. This same method was used to analyze students' behavioral response to the intervention.

### ***Visual Analysis***

Visual analysis is used in single case studies to evaluate data patterns and evaluate whether there is a functional relationship between the intervention and any changes in behavior (Gast & Ledford, 2018). All data that was collected and analyzed through descriptive statistics was then graphed in a scatter plot and analyzed visually to determine whether there was a trend in any of the behaviors being observed.

### ***Interrater Reliability***

Interrater reliability was calculated through percentage of agreement between the two observers. The V-note software provided an output of each coded instance and how the two raters rated each instance. That report was then analyzed for each video recording session to calculate the average agreement per session. Once all videos were analyzed by each rater, the average agreement for each individual participant and the overall agreement for all video recordings was calculated.

## **Fidelity**

Fidelity checklists were used at each of the three fidelity check points to confirm that the intervention that was proposed was the intervention that was provided. Those results were then analyzed by the researcher for the percentage of implementation.

For classroom-based training, 100% of training participants completed their “exit ticket”, which measured fidelity, and the outside rater observed 2/3 of the recorded sessions of training. One recorded training had an error during recording, making it unable to be shared with the outside rater. On-the-job coaching was checked at 100% of opportunities by the supervising teacher of each paraprofessional. The final point of fidelity checked was checked during feedback sessions provided during the on-the-job monitoring and feedback sessions. Each participant received three of these, with 100% of the sessions being recorded and analyzed by an outside rater.

## **Social Validity**

Social validity data were collected through Likert scale questions on the surveys administered following each phase of the training and upon completion of the intervention. The study contained a small sample size, three paraprofessionals, providing a relatively small data set to be analyzed. The data collected was reviewed and summarized in the text of chapter four, with the complete data set organized into charts and provided in the Appendix. The researcher’s field notes and anecdotal observations were analyzed utilizing the qualitative procedures below.

## **Qualitative Data**

Qualitative data were collected through three separate methods: open ended survey questions that were included on surveys completed by each participant following each phase of the study, researcher field notes, and anecdotal notes collected during review of student behavioral responses by paraprofessionals. Following Charmaz’s

(2014) approach, these data were broken down first into initial codes, then categories, and later analyzed further to establish themes. Themes were used to answer research questions and help determine future cycles of research. To stay connected with this manageable data set, the researcher analyzed and coded the data by hand. Careful attention was made to code for action, as “coding people as types lead you to focus on individuals rather than what is happening in the data” (Charmaz, 2014, p. 162).

### **Conclusion**

In this chapter, a single subject multiple baselines study was described to include the participants, context, intervention, data collection procedures and analysis, points of fidelity, and interrater agreement. The study included a total of six participants, three paraprofessionals and three students, and was situated at a private placement option for students who have developmental disabilities. Paraprofessionals were provided a phased training protocol that included classroom-based training, on-the-job coaching, and on-the-job monitoring and feedback. Data were collected through daily video recorded sessions and analyzed for adult implementation of the hand under hand teaching strategy and student response to the new strategy. Additional qualitative data were collected through four surveys administered to paraprofessionals immediately following each phase of the intervention and upon completion of the study, researcher field notes, and anecdotal observations made during video analysis. Quantitative and qualitative data were analyzed separately, then triangulated to answer each of the research questions and reviewed in the subsequent chapter.

## CHAPTER 4

### RESULTS AND ANALYSIS

The research questions guiding this study were designed to look at the effectiveness of the Teaching Skills Training Program on both adult and student behaviors. The first question analyzed the results of the training package used on adults' implementation of the targeted teaching skill and was analyzed with quantitative data. The second question looked at social validity; it asked the paraprofessionals how they felt about the training package used and the new teaching strategy of hand under hand. Research question two was answered with both quantitative and qualitative data sets. The final question focused on the student participants and how they responded to hand under hand replacing hand over hand instruction and was answered with a combination of quantitative and qualitative data. Due to the integration of quantitative and qualitative data in the research questions, and the focus of the data being collected for both adults and students, this chapter is organized by research questions. Each research question will serve as a section of the chapter, with the corresponding data reviewed.

#### **Effects of Training**

The initial research question guiding this study used quantitative data to determine the effects of the training package. To answer this question, quantitative data were collected through video analysis to measure adults' implementation of the hand under hand teaching strategy in place of the hand over hand teaching strategy. As described in chapter three, each of the paraprofessionals recorded themselves working with their student participant daily for five weeks. Those videos were then analyzed by the researcher for the average use of hand-under-hand instruction. The results are reviewed and compared for all paraprofessionals together and then the results for each

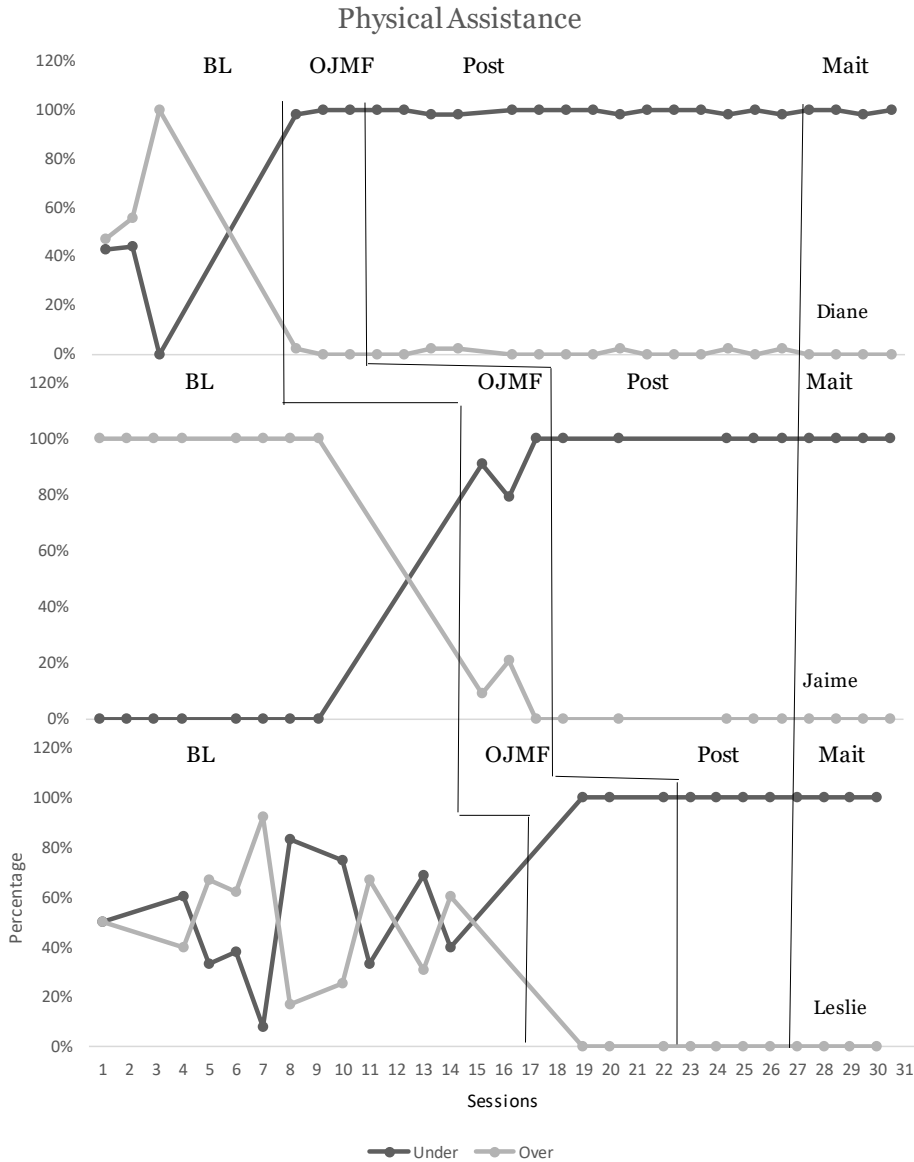
adult are described individually. The section concludes with a review of procedural data collection on the implementation of the intervention.

### **Results for all Paraprofessionals**

Figure 3, on the next page, depicts the results from adult use of hand over hand vs hand under hand assistance. The data for participant 1 (Diane) is at the top of the graph; participant 2 (Jaime) is in the middle, and participant 3 (Leslie) is on the bottom.

**Figure 3**

*Adult Use of Hand Over Hand and Hand Under Hand*



*Note. BL stands for baseline data, OJMF stands for the On-the-job monitoring with feedback portion of the training package, post is referring to data collected after the intervention was completed, and maint stands for the maintenance data that was collected for each participant two weeks following the completion of post intervention data.*

During the observation portion of the training package, each participant increased their use of the hand under hand teaching strategy and continued to increase to almost 100% throughout the post intervention data collection sessions and throughout maintenance data collection, demonstrating that there was a functional relationship between the intervention and the change in adults' behavior.

The results for each of the paraprofessionals during each phase of the study are presented below. Each participant started baseline data collection on the same day and ended post intervention data collection on the same day to maintain the integrity of the multiple baselines study design. Data were collected for the three paraprofessionals in four sessions of the maintenance phase two weeks following the completion of post intervention data.

***Participant 1: Diane***

Participant one recorded a total of five baseline data sessions, but only three videos were able to be used. Two videos were compromised in the saving process and were never recovered. The third available session, shown in Figure 3, was incomplete due to camera malfunction. The camera stopped recording after just five minutes without anyone noticing. Despite these setbacks, it is believed that Diane's two complete and one incomplete baseline data sets were sufficient due to the consistency in the first two data sessions.

As previously stated, Diane had no previous formal training on the hand under hand teaching strategy. The classroom teacher she works with had previous training as a participant in the initial cycle of research and provided regular coaching and modeling of the hand under hand strategy prior to Diane's participation in this study. This background knowledge and experiences with her supervising teacher are evident in her data. During the first two baseline sessions, Diane was using a combination of hand



under hand and hand over hand instruction. On the third baseline session that data shifted, and she was primarily using hand over hand.

As Diane entered the training phase, she increased her implementation of hand under hand to 98% of all opportunities to provide physical assistance on the first day, and then 100% for the two consecutive dates she was observed by the researcher. Once released to collect her post intervention data, Diane maintained the use of the strategy at 98-100% throughout the remainder of her data collection and during maintenance data collection. Diane was most consistent in data collection, and only missed one scheduled session due to being off campus for the student's prom.

***Participant 2: Jamie***

Jaime collected a total of eight baseline data sessions, missing two scheduled days due to adult and/or student absences. Jamie had no previous experience with the hand under hand strategy, which is evident in her baseline data. Jaime was consistent in using hand over hand guidance 100% of the time when her student required physical assistance. The student Jamie was working with required far less physical assistance than the other two student participants, which will be discussed later during the review of student behavioral responses.

As Jaimie received the training package, she quickly replaced hand over hand with hand under hand. You can see in the chart that she slowly increased her use of hand under hand guidance, reaching 100% on the final on-the-job coaching session. Once released to collect post intervention data and then maintenance data, Jamie maintained 100% implementation of the hand under hand strategy. During the scheduled training package days, Jamie and her student missed two days, which made the training take longer than planned, thereby reducing the total days available for post intervention data. In addition to starting post intervention data collection late, Jamie and her student

missed four days due to illness during the post intervention data collection phase, leaving her only able to collect data on five days.

### ***Participant 3: Leslie***

At baseline, Leslie was using a combination of hand over hand and hand under hand instruction. Leslie had previous training on the hand under hand teaching strategy consisting of a large group lecture with some role play practice.

As the third and final participant, Leslie's baseline period was long with a total of ten sessions out of a total of 14 scheduled sessions. Leslie missed four baseline sessions due to adult and student absences. During baseline, Leslie's data were consistently within 40-60% use of the hand under hand strategy, demonstrating stability that is looked for in single subject research. Once training was provided, Leslie shifted to 100% use of the hand under hand strategy during the observation phase, which then continued into the post intervention and maintenance data collection. Leslie's training package also took longer than expected due to absences. This reduced the total number of days available for her to collect post intervention data, leaving her with only four opportunities.

### **Fidelity**

Procedure fidelity is necessary during single case studies to ensure that the intervention was implemented as intended (Gast and Ledford, 2018). Procedural fidelity was assessed at three separate points throughout the intervention to ensure integrity of the intervention. All three fidelity assessment tools can be found in Appendix B, C, and D.

### ***Classroom-Based Training***

The first point of procedural fidelity was checked at the first phase of the intervention, classroom-based training. The overall percentage of implementation for all

11 components across the three training sessions was 99.6%. The second and third sessions were rated at 100% by all participants, and the first session was rated at 99% with just one participant reporting that one component did not occur. The outside rater observed and reported implementation at 100% for both sessions she was able to observe. When asked to report sessions of coaching and feedback during the role play portion of the training, P1 reported receiving 4+ sessions, P2 reported 2-4 sessions, and P3 reported 4+ sessions.

### ***On-the-Job Coaching***

Each paraprofessional received one session of on-the-job coaching and monitoring, which was individualized to show how to implement hand under hand with a student. Fidelity was checked at the point of administration by each paraprofessional's supervising teacher signing off that this session occurred. Fidelity was obtained at 100% delivery of on-the-job coaching.

### ***On-the-Job Monitoring with Feedback***

The final point of fidelity was checked during the last phase of the intervention, on-the-job monitoring with feedback. The outside rater reviewed 100% of the recorded feedback sessions and reported an overall 95% attainment by the researcher. Feedback was provided at 100% for the first three steps of the protocol, and 80% for the final two steps. The fourth step of the protocol was to ask if the participant had any questions about the feedback they received, the researcher missed providing this opportunity for one participant during one session and the recording cut out before the final step of the protocol on another recording making it so that the outside rater could not confirm it occurred.

## **Social Acceptability**

The second question guiding this study focused on the social acceptability of the training package and the new teaching skill of hand under hand instruction. Social acceptability of the training package and the strategy of hand under hand was measured through surveys administered to the paraprofessionals following each phase of the intervention. Each survey measuring three separate acceptability constructs: the training process, the teaching strategy, and the paraprofessional's perception of student behavioral responses.

Results are first presented on social acceptability of the training package and then social acceptability of the teaching strategy. Likert scale survey questions are reviewed first, then open-ended survey questions, followed by researcher field notes. Results associated with paraprofessionals perception of student behavioral response will be reviewed later as part of the findings aligned with the final research question.

### **Social Acceptability of Training Package**

As described, surveys measuring the acceptability of the training package were administered following each phase of the intervention (classroom-based training, on-the-job coaching, and on-the-job monitoring with feedback.) The first three administrations asked paraprofessionals to rate how they felt about the training component they just received, and then asked open-ended questions about what they liked about that component and what could be changed. In the fourth administration of the survey, paraprofessionals were asked to reflect on the entire training package. Tables illustrating the complete data set are provided in Appendix E.

### ***Likert survey questions***

Following each component, paraprofessionals were asked to rate the training with the options of: Excellent, Good, Fair, Poor, or Very Poor. All three paraprofessionals rated each component of the training package as excellent.

Upon completion of the intervention, each paraprofessional was asked how they felt about the entire training package, in addition to which component was most beneficial and which component was least effective in teaching them how to use and implement the hand under hand teaching strategy. All three paraprofessionals provided an overall rating for the training package of excellent. One participant indicated that observations with feedback were most beneficial, and one participant indicated that classroom based training was least effective.

### ***Open ended questions***

Surveys administered after each component and at the conclusion of the study included open-ended questions to further elaborate on the Likert responses. The paraprofessionals were asked to identify something they liked about the training provided, and something that could be improved. The open-ended responses were not required, and some paraprofessionals did not respond to all open-ended questions. The complete responses provided related to the social acceptability of the training process are provided in Appendix E and summarized here.

**Following Classroom-Based Training.** In the survey following classroom-based training, paraprofessionals were not asked any questions associated with acceptability of the training.

**Following On-the-Job Coaching.** Responses to open-ended questions aligned with acceptability of the training package following on-the-job coaching did not

reveal much data; paraprofessionals had very little to say. One paraprofessional reported that they liked this opportunity for explanations and verbal/visual feedback.

**Following On-the-Job Monitoring with Feedback.** In response to on-the-job monitoring and feedback sessions, each participant reported that they enjoyed receiving feedback, having questions answered, and having tips offered by the researcher.

**Survey at Completion.** When asked what they liked about the training package in its entirety, paraprofessionals reported that it was informative, helped improve their relationship with their students and that monitoring with feedback helped. When asked what could be improved at each phase of the training package, none of the paraprofessionals offered any suggestions or recommendations. Rather, they offered comments such as:

- “The training was well thought out and explained.”
- “Everything was perfect during the training.”
- “Nothing needs to be changed, all feedback and techniques shown have given me great results.”

When asked more specifically which components were more beneficial and which were least effective, two paraprofessionals agreed that all three components were beneficial, and one stated that observations and feedback were the most beneficial. In response to what component was least effective, two paraprofessionals were unsure, and the third felt that the classroom-based lecture portion was least effective.

### ***Researcher Field Notes***

Researcher field notes were collected throughout the entire intervention to further triangulate the data obtained through other sources, such as documented

conversations with paraprofessionals and their supervising teachers, along with anecdotal observations made while watching each of the recorded sessions. The analysis indicates that classroom-based training alone was not enough to ensure a high level of efficacy in the implementation of the new teaching strategy and generalization across activities and routines.

Following classroom-based instruction, all three paraprofessionals initially implemented hand under hand in what the researcher termed an “all in” (as defined in the glossary) manner. As each of the paraprofessionals received on-the-job coaching and on-the-job monitoring with feedback, they started to use and implement other evidence-based practices such as role release, partial participation, and backwards chaining. Although these skills were taught during the classroom-based portion of the intervention, paraprofessionals were not able to implement them during instruction until further training was provided in subsequent phases through coaching, modeling, and providing feedback on their implementation.

### **Social Acceptability of Hand Under Hand Instruction**

Results of the Likert scale questions will be reviewed first, followed by the open-ended questions, then findings obtained from researcher field notes, and concluded with a summary.

#### ***Likert Survey Questions***

Following classroom-based training, before implementing the new teaching strategy, paraprofessionals were asked how likely they were to try the new strategy. All three paraprofessionals responded that they would “definitely try” the new strategy when working with their student. When rating their overall feelings of the teaching strategy, all three paraprofessionals stated that they really liked the strategy throughout each of the phases of training. When asked questions associated with their confidence in

implementing the new strategy when working with their student, two paraprofessionals felt confident following on-the-job coaching, and one felt confident but needed more practice. After being provided with three sessions of on-the-job monitoring with feedback, all three paraprofessionals reported feeling confident in their ability to use the new strategy and continued to feel confident at the completion of the study.

### ***Open Ended Survey***

To support and further explain the results of the Likert Scale questions reviewed above, paraprofessionals were asked to elaborate on how they felt about the new teaching strategy through open-ended survey questions. Each survey contained two open-ended questions associated with the acceptability of the hand under hand teaching strategy. Participant responses are summarized below and included in Appendix F.

**Following Classroom-Based Training.** Each paraprofessional offered appropriate ideas for when they might try using the hand under hand strategy, including examples made during the training, demonstrating comprehension of the training material covered. When asked about anticipated challenges, only two paraprofessionals answered, one completed the survey after they already started using the strategy and reported no challenges yet. The second paraprofessional reported being concerned that students would become reliant on adults and that they would not be visually engaged with activities and materials with which they were working.

**Following On-the-Job Coaching.** The paraprofessionals were asked two open-ended questions related to the social acceptability of the teaching strategy. The first question asked about activities where they had been successful using the new teaching strategy. One paraprofessional discussed daily tasking; during their daily activities she reported being able to support her student to hold items rather than throw them. Another shared that they used scissors to complete a cutting activity, and during this



time her student appeared to be less stressed than usual during this same activity. When asked about things they found challenging, one paraprofessional answered that there were no challenges, another left this question blank, and the third referred to students not being visually engaged and taking advantage of the help.

**Following On-the-Job Monitoring with Feedback.** Following this phase of the intervention all three paraprofessionals answered both questions related to acceptability of the teaching strategy. Each offered examples of activities in which they felt successful, with one stating that her student was starting to show interest in using both hands. When asked what they have found to be challenging, one paraprofessional stated that they are not having any challenges. Another reported that they were having trouble using hand under hand to work on using a zipper, and that changing materials used made the task easier. The third reported having a hard time getting her student to reach out further to get to the materials when using hand under hand.

**Survey at Completion.** Upon completion of the training package and collection of post intervention data, all three paraprofessionals answered the first open-ended question that asked what they have enjoyed about the new strategy, and two answered the question related to challenges they faced. When discussing what they enjoyed about the strategy, they each reported feelings of satisfaction related to their student's progress, reduced stress, increased interests, and student success. When asked what did not go well, no specific examples were provided; one paraprofessional left this answer blank, another said this was not applicable to them, and the third stated they had not experienced anything that did not go well.

### ***Researcher Field Notes***

Upon analysis of data aligned with acceptability of the teaching strategy, two themes emerged. First, paraprofessionals were observed to generalize the use of the

strategy outside of the data collection sessions; second, there was a notable improvement in the adult/student relationship and student performance. These themes stood out in the behavioral observations of adults and students and through the field notes and anecdotal observations taken by the researcher.

**Generalization.** Diane was observed to demonstrate the highest level of generalization with the new strategy. Following the classroom-based training, Diane reported that she went home and used hand under hand with her daughter as they practiced a writing activity; she also taught her husband the strategy. This enthusiasm for the new strategy continued throughout the intervention and weaved through each conversation the researcher had with Diane. While the researcher provided regular services in the classroom, outside of the study, Diane was observed on more than one occasion using hand under hand with each student as she provided whole group instruction, and while working 1:1 with her study participant outside the context of the study. The ability and desire to generalize the use of the strategy during other classroom activities, and at home, stood out as evidence that this strategy was well accepted by Diane.

**Improved Relationships and Student Performance.** The second theme that emerged for all three paraprofessionals was an improvement in the adult/student relationship. Through conversations with the paraprofessionals, their supervising teachers, and observations made while analyzing video footage, it became apparent there was improvement in relationships and trust. Each student's behavior improved, the amount of reinforcement needed to participate dropped, thereby causing their overall worktimes to reduce. They were spending more time engaged and participating, which caused them to get through tasks at a faster pace.

Diane reported that her student Claire, sought her out during the day, and demonstrated anticipation for their time together by going to the location where they worked as it approached that time. Watching Jamie and James shed light on two people truly working together. As they learned how to effectively navigate teaching and learning by hand under hand instruction, James demonstrated a natural tendency to take over a task when he was ready. At the start of the intervention, when watching Leslie work with her student Kevin, she was observed to get frustrated and impatient. Leslie spent lots of time waiting for Kevin to initiate, and Kevin spent lots of time waiting for Leslie to show him what to do and then help him complete the task. As their relationship developed and Leslie fine-tuned the provision of instruction through hand under hand, trust was established. Kevin started reaching out as soon as Leslie presented materials and to initiate activities and join when prompted. Improved relationships seemed to then lead to improved performance by each of the students.

### **Student Response to Hand Under Hand Instruction**

The final research question looked at student behavior in response to the implementation of the replacement teaching strategy of hand under hand. To answer this question, data were collected through the surveys administered to paraprofessionals following each phase of the intervention and through analysis of student behavior in response to the new teaching strategy.

#### ***Paraprofessionals Perception: Survey Questions***

The results of the survey questions associated with adult perceptions of student response to hand under hand instruction are provided in Tables 10 and 11. Table 10 contains the results obtained following classroom-based training and before implementing the new strategy with their students, and Table 11 contains the results obtained following each subsequent phase of the training package.

**Table 10**

*Paraprofessionals' Perceptions Following Classroom-Based Training*

In your opinion, how do you feel your students will respond to instruction provided through hand under hand instruction instead of hand over hand instruction?		
P1: Well	P2: Well	P3: Well
What do you anticipate your student's level of involvement in activities to be when hand under hand instruction is used in place of hand over hand instruction?		
P1: Willing to Participate	P2: Willing to Participate	P3: Willing to Participate
What do you anticipate your student's level of participation in activities to be when hand under hand instruction is used in place of hand over hand instruction?		
P1: Active Participant	P2: Active Participant	P3: Active Participant

After the initial introduction and training on the hand under hand teaching strategy, all paraprofessionals reported feeling that their student would respond well to the implementation of the new strategy. When asked specifically what they anticipated their student's level of involvement to be, willing or resistant, all three reported that they anticipated their student would be willing to participate. When asked what level of participation their student would demonstrate, active or passive, they reported that they anticipated their student would be active participant in classroom activities.

**Table 11**

*Paraprofessionals' Perceptions Following Remainder of the Training Package*

In your opinion, how do you feel your students have responded to instruction provided through hand under hand instruction instead of hand over hand instruction?			
On-the-Job coaching	P1: Responded well	P2: Unsure how to participate	P3: responded well
On-the-job monitoring with feedback	P1: Responded well	P2: Responded well	P3: responded well
Completion	P1: Responded well	P2: Unsure how to participate	P3: Responded well

On the surveys following each of the subsequent phases of the training package, and then at completion, paraprofessionals were asked just one Likert Scale question

aligned with their perception of student response to the new strategy. Participant one and participant three reported feeling like their student responded well to the new strategy on all three surveys. Participant two reported that they felt their student was unsure how to participate in activities when provided with hand under hand instruction following on-the-job coaching with feedback, and then again at the completion of the study.

### ***Open Ended Survey***

At each survey administration, paraprofessionals were asked open-ended questions aligned with how they perceived their student was responding to the new teaching strategy. All three provided an answer to all questions associated with their perceptions of the student's response. Each survey had just one open-ended question aligned with this construct, except the survey administered at the conclusion of the study; it had two. Responses to the surveys are summarized below, then provided in Appendix G.

**Following Classroom-Based Training.** At this point, paraprofessionals were asked how they anticipated that their student would respond to hand under hand instruction. All three paraprofessionals anticipated a positive result. One paraprofessional reported that her student does not like hand over hand instruction and that she felt she would be more engaged when hand under hand was utilized in its place. Another reported that the use of hand under hand could be a learning experience for both, but once they got comfortable the student would pick everything up quickly.

**Following On-the-Job Coaching.** After receiving on-the-job coaching paraprofessionals were asked to describe how their students were responding, each participant reported positive perceptions. There were reports of students being responsive, less aggressive and that hand under hand has helped their students.

**Following On-the-Job Monitoring with Feedback.** At this point, the responses became a little longer and descriptive. They continued to tell the story of students who are responding well to a new method of offering support and teaching. One participant reported that her student was becoming less aggressive and completing activities more quickly. Another described that her student was understanding how to participate in this way and would receive the instruction he needs, then take over when he feels confident. The final participant reported that her student was more interested in learning and more confident.

**Survey At Conclusion.** At the conclusion of the study, the paraprofessionals were asked two open-ended questions associated with how they felt their student responded to the new strategy. All responses were positive, indicating that their students were responding well. One participant stated that hand over hand instruction made her student aggressive; the switch to hand under hand made her more willing to engage in activities. Another felt that hand under hand was less stimulating, which caused her student to like the strategy better. They described their students as responding positively and willing to participate, to try and learn new things, and to require less prompting.

### ***Student Participation***

Figure 4 presents the results of observations on students' participation (active or passive) in the paraprofessional led activities of tasking. Following Figure 4, each student's data is described individually.

**Figure 4**

*Student Participation, Active or Passive*



*Note. BL stands for intervention baseline, OJMF stands for the on-the-job monitoring with feedback portion of the training package, post is referring to data collected after the intervention was completed, and maint stands for the maintenance data that was collected for each participant two weeks following the completion of post intervention data.*

In Figure 4, passive participation is represented with a light-colored line, and active participation is indicated with a darker colored line. Students Claire and Kevin both started at baseline primarily as passive participants during the structured daily activities of tasking and slowly shifted to mostly active participation throughout the intervention. James started and ended demonstrating active participation but continued to show an increase in active participation and reduction in passive participation. This data demonstrates a functional relationship between the intervention and changes in students' participation. Student results are described in more detail individually below.

**Claire.** Claire was the first student participant to receive the intervention and worked with paraprofessional Diane throughout the study. At baseline, Claire demonstrated similar levels of active and passive participation, ranging between 40%-60%, with slightly higher levels of passive participation. During this period, Diane was using a combination of hand over hand and hand under hand instruction. At the point of the intervention, Claire shifted to increasing her active participation in the activities and reducing the periods of time that she was participating in a passive manner. If you recall, following initial training and on-the-job monitoring with feedback, Diane had maintained almost 100% implementation of hand under hand instruction.

**James.** James was the second student participant to receive the intervention while working with Jamie. At initiation of the study, James' first three data points were inconsistent, his data became stable on the fourth session, averaging around 80% active and 20% passive participation. Jamie, the adult he was working with, used very little physical assistance during the baseline phase of the intervention. Jamie averaged only 7.5 instances of physical assistance per data collection session, which was far lower than the other two paraprofessionals. As the intervention was delivered, Jaime increased her use of physical assistance during activities, and James slowly became more active and



less passive during instruction. In the post intervention and maintenance data collection phase, you can see that James had four sessions where he was 100% active when participating in activities with Jamie, two sessions where he was actively participating at 70%, and three sessions where he was actively participating between 70%-80%.

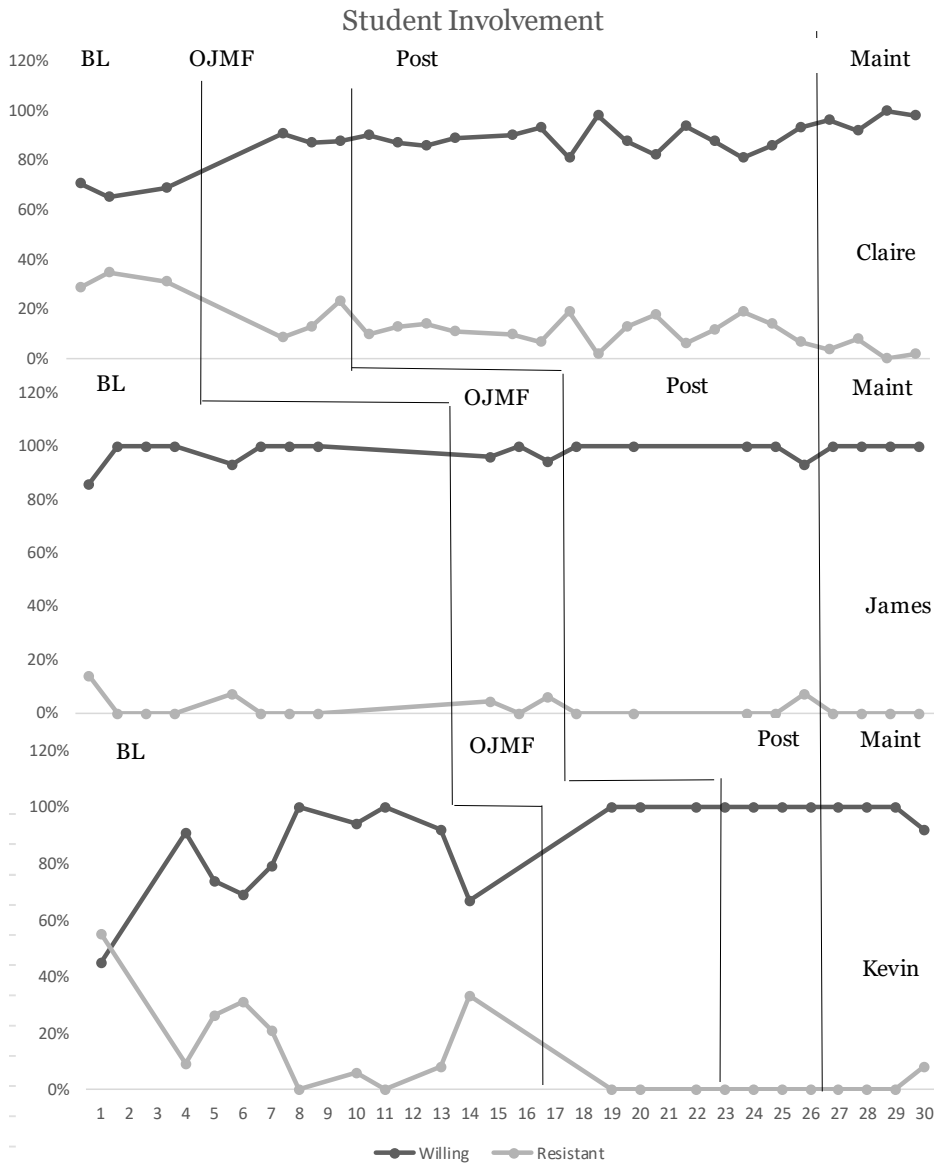
**Kevin.** The final student participant, Kevin, worked with Leslie throughout the intervention. Kevin had the longest baseline period, but never reached stability in his data. Throughout baseline, Leslie was using a combination of hand under hand and hand over hand instruction, in addition to long stretches of waiting for Kevin to initiate participation. This was seen in Kevin's behavior as being a mostly passive participant in the activities, ranging from 40% passive to 92% passive. As the intervention was administered, Kevin's data slowly shifted with passive participation reducing and his active participation increasing. At the point that maintenance data were collected, two weeks following the last post intervention data session, Kevin was an active participant 93% of the time and a passive participant only 7% of the time.

### ***Student Involvement***

Following the coding for student participation, each video was then analyzed for students type of involvement, either involved in the activity willing or with resistance. The data is shown below in Figure 5 on the next page and then summarized by student.

**Figure 5**

*Student Involvement, Willing or Resistant*



*Note. BL stands for intervention baseline, OJMF stands for the on-the-job monitoring with feedback portion of the training package, post is referring to data collected after the intervention was completed, and maint stands for the maintenance data that was*

*collected for each participant two weeks following the completion of post intervention data.*

As shown in Figure 5, willingness to be involved in activities is illustrated by a dark line and resistance to being involved in activities is indicated by the lighter line. In these charts we can see that both students Claire and Kevin start with higher levels of resistance and slowly become more willing as the intervention occurs. James' data stays consistent throughout; he primarily demonstrated a willingness to participate and demonstrated little resistance to being involved in the classroom activities. This data indicates a functional relationship between the intervention and students type of involvement in adult led tasks.

**Claire.** At baseline, Claire was willingly involved and participated in activities an average of 68% of the time and was resistant to participation 32% of the time. We can visually see in the chart a slow increase in willingness and a decrease in resistance as the intervention progresses, with her averaging 98% willing and 2% resistant at the point of maintenance data collection.

**James.** James was the most resistant on the very first data collection session at 14%, his resistance reduced and evened out and remained steady throughout the remainder of the intervention. His overall average for willingness to be involved in classroom activities was 98%, with his resistance to involvement only 2%. There were minimal changes throughout the intervention, with some slight variations at phase changes.

**Kevin.** At baseline, Kevin averaged being resistant to involvement in activities 19% of the time, and willing to participate an average of 81% of the time. Visually, we can see in Figure 6 that the first data collection session showed the highest level of resistance and that Kevin responded positively to the change in physical assistance being offered

throughout the intervention. As soon as training occurred with Leslie, Kevin's resistance dropped to 0% and his willingness to participate rose to 100%, except for the final maintenance data session.

### ***Anecdotal Observations***

While analyzing recorded sessions, the researcher made anecdotal observations on each student's participation and involvement. This data set was then analyzed and triangulated with researcher field notes to establish any additional themes that were not captured in the quantitative data alone. As the data were analyzed, it became apparent that student response to the new teaching strategy could not be discussed in isolation from the adults' experiences, as their relationships were intertwined.

**Claire.** Of all three student participants, Claire spent the most time resistant to instruction throughout the entire intervention. At the start of the intervention, her paraprofessional, Diane, was using a combination of hand under hand and hand over hand and they appeared frustrated with each other. As Diane developed her ability to implement hand under hand instruction, Claire's resistance reduced. When the study started, Claire spent lots of time frustrated, upset, trying to leave the area of instruction, and throwing her materials. The interaction was tense and uncomfortable for both participants, and for the researcher to watch. As the study progressed, these behaviors reduced, and Claire started to anticipate and initiate activities. She started to reach out when materials were presented, join Diane through hand under hand instruction, and complete steps in the activity as Diane role released portions of the task through backwards chaining. The data also showed Claire watching and waiting between activities and she became easier to redirect when she did lose interest in a task.

Claire did best with familiar activities and routine. As activities and expectations became familiar and routine, Claire was able to participate with less resistance and in a

more active manner. When new activities were presented, Claire would get upset and become resistant to instruction. As their relationship improved and trust was developed, Claire would still get upset when presented with unfamiliar tasks, but she was able to re-engage with the activity more quickly and easier than at the start of the study.

As the study progressed, some of Claire's resistance appeared to be reflexive in nature, rather than true refusal of a task. Initially Claire was resistant to all instruction, however, as the study progressed, her resistance reduced drastically, and she became mostly willing to participate. When she was resistant, it tended to be at the presentation of materials when she would try to throw them as soon as she saw them, then, when prompted, she would join and participate with no trouble. For example, one task that Claire completed was picking up items and then placing them into a container to support one of her occupational therapy goals. Through hand under hand instruction, Diane would hold the item, giving Claire very little control, which made it so that she could not throw it, and have her join through partial participation. Initially Claire's only expectation was to bring her hand up to Diane's as Diane placed the item in the container. As the sessions progressed Diane flipped her hand, so she was holding the item in her palm, with her palm facing up and Claire placed her hand on top of the item. This led to Claire and Diane holding the items together. Diane held one side and Claire held the other until eventually Diane would let go at the last second so Claire placed the item in the container on her own.

**James.** James was the most independent of all the student participants. He was able to complete many tasks on his own, and at the start of the study his adult, Jamie, was using little to no physical assistance. At the start of the study, however, James required numerous breaks for each data collection session. He was observed to hold Jamie's phone or keep it close as time counted down until he could have a break. While

he demonstrated only a few instances of resistance, you could see him get frustrated with challenging tasks. At the start of the study, Jamie waited long stretches before helping, typically after the point of James getting frustrated.

Two things stood out in the data associated with James; first, it took James a long time to understand how to participate or receive support through hand under hand instruction. James was familiar with hand over hand instruction, he was familiar and comfortable when provided support in this manner, and because Jamie used minimal physical assistance, he appeared to be ok with hand over hand support. As she initiated hand under hand support, his resistance increased briefly, and he would pull his hands away and become passive. He didn't understand what she was asking him to do; it was foreign. As Jamie became more comfortable using hand under hand, he slowly understood what she was asking, and he started to reach out to participate again and take over portions of tasks he could complete independently, which led to this fluid and natural balance of support being offered and independence encouraged.

As both James and Jamie became comfortable with working together through hand under hand assistance, their relationship developed and their exchanges became seamless. Jamie would invite him to join her in an activity, get him started or past the steps he couldn't do, then easily release the activity to him. James was working on challenging fine motor tasks such as buttoning, attaching nuts to bolts, and using zippers. Jamie would help him get started then slowly slide her hands out, each session offering a little more independence and encouragement to try the steps he hadn't yet mastered. As this pattern continued, James required few, if any breaks, he was able to work for the full 20–30-minute sessions, and his frustration appeared to reduce.

**Kevin.** Kevin was the final student to receive the intervention, therefore he had the longest baseline period and fewest post intervention data collection sessions. Even

with the short post intervention timeline, Kevin quickly increased his participation following the implementation of hand under hand instruction. Throughout baseline it became apparent that Kevin and his adult, Leslie, were waiting for each other. Leslie had previous training on hand under hand instruction and used a combination of hand under hand and hand over hand support when helping him. She also offered lots of wait time for him to initiate activities, and he didn't appear to truly understand what was being asked or have the dexterity to complete the tasks independently, so he waited for her help. It was a vicious cycle that played out over and over throughout the extended baseline period.

As the intervention was initiated and Leslie started to support Kevin more, she appeared to take more time to teach him what was expected rather than wait for him to complete a task he wasn't sure how to complete. As the sessions went on, Kevin became happier, reaching out quickly to initiate, and he seemed to enjoy some of the activities he was completing. He appeared to start to understand what was being asked and what he needed to do; he demonstrated a sense of accomplishment as he completed activities he couldn't do previously on his own.

Two of the three paraprofessionals reported their student responded well, with one participant reporting that their student was unsure how to participate when hand under hand assistance was provided. When combined with observational data, all students became more actively involved in their activities and more willing to participate following the initiation of hand under hand instruction in place of hand over hand instruction. This finding was further supported by the anecdotal findings collected throughout the video analysis process.

### **Interrater Reliability**

Interrater reliability was calculated for all behavioral observations. The outside rater blindly coded 30% of the behavioral instances originally coded by the researcher for 30% of all video data collected. The outside rater analyzed 30% of the videos for P1, 35% of the videos for P2, and 33% of the videos for P3. The overall agreement for each of these videos was 89%, with agreement for P1 97%, P2 87%, and P3 83%.

### **Conclusion**

Results of the study were reviewed and organized in alignment with each of the guiding research questions. The triangulation of quantitative and qualitative findings indicate that the intervention was successful in producing a high level of implementation of the hand under hand strategy in place of hand over hand for all three paraprofessionals. Implementation of hand under hand instruction also led to students' increase in active participation and increased willingness to be involved in adult led tasks. In addition, paraprofessionals reported that they enjoyed the training process and the teaching strategy, indicating that both were acceptable. These results will be expanded on and discussed further in the next chapter, organized in alignment with each of the research questions, and will include possible implications and future applications.



## CHAPTER 5

### DISCUSSION

This study had three main findings related to the three guiding research questions. First, the hand under hand strategy can be taught to paraprofessionals to promote student participation and involvement. Second, paraprofessionals tend to find the use of this strategy acceptable and effective. Finally, student participation and involvement in tasks can be promoted using this strategy. These three main findings will be discussed in the initial sections of this chapter and be reconnected with the guiding theoretical frameworks. The results will then be connected back to existing literature, and how this study adds to the existing literature base on the effectiveness of the hand under hand teaching strategy. Following these outcomes, the potential implications of future intentional training practices and an expansion of use of hand under hand in the local context will be highlighted before concluding with future possibilities. This study is the first of its kind, leading to the potential for future research and additional discoveries of the true value that hand under hand has to offer.

#### **Outcomes Related to Research and Theory**

This study was developed through the lens of three main theories, Vygotsky's ZPD and spontaneous concept development, and the perspective of sensemaking. Each of these theories was carefully selected and analyzed to create the training provided and in determining an appropriate teaching strategy to target. This section discusses the findings related to the research questions, while reconnecting to the theories that guided the study.

#### **Discussion: Effectiveness of Training**

The training process was designed to align with the perspective of sensemaking, and how people construct meaning and act in response to the meaning they derive from

information provided. The training package offered was intentionally developed to include three different methods of sharing information to account for and ensure proper sensemaking by each participant. The quantitative data collected clearly demonstrated the effectiveness of the training package, with all three paraprofessionals mastering the strategy and maintaining that mastery through the maintenance data sessions. Diane not only mastered the strategy, she also mindfully pointed out in her recorded sessions each time she unintentionally used hand over hand instruction.

What didn't come through in the quantitative data were that classroom-based training on its own was not enough to ensure efficacy at that level. Diane and Leslie both had received some prior exposure to the hand under hand strategy. Diane received modeling on the hand under hand strategy from her supervising teacher, who had been trained on the strategy and participated in initial cycles of this study. Leslie previously received a similar version of the same classroom-based training provided by the researcher a year prior. It was evident in the data that they were familiar with the strategy because they both used a mix of hand over hand and hand under hand instruction throughout baseline, however, they had not yet mastered the nuances of the strategy or demonstrated the ability to generalize across activities and routines. Jamie had no previous training, which was evident in the data and in how she required all three of her observation with feedback sessions before her implementation improved, while Diane and Jamie averaged almost perfect implementation throughout those same three observation sessions.

Following classroom-based training, all three paraprofessionals demonstrated what the researcher termed an "all in" behavior, which was introduced in chapter four. This "all in" behavior did not allow the student to have their hands on the materials or account for students' individual levels of independence. As the name implies and in how

the term is defined, the “all in” approach is an appropriate response; students place their hands on the hands of an adult. However, the hand under hand strategy is designed to extend past that and be used as a method for providing scaffolding supports and explicit instruction and for promoting active engagement. Despite the classroom-based training offering instruction on how to role release, phase out, use backwards chaining, and partial participation, these practices did not transfer from classroom-based training without additional modeling and coaching. The data collected showed that each participant started to role release responsibilities to their student, accept partial participation, and encourage independence where and when appropriate as the intervention progressed, not immediately following classroom-based training alone.

Through the lens of sensemaking, paraprofessionals learned the strategy and they were able to transfer that information into action; an effective training package was provided that accounted for opportunities to mitigate any unintentional sensegiving. As the paraprofessionals drew on their past knowledge base and previous experiences, they made decisions on how to implement the hand under hand strategy, with limitations. Through further instruction and individualized attention, their “well of knowledge” (Wong, 2019) expanded and their implementation of the strategy progressed.

### **Discussion: Acceptability**

Paraprofessionals offered no suggestions for improvement during any phase of the training and reported enjoying components of receiving feedback and having time to get their questions answered. While all paraprofessionals reported enjoying all phases of the training, it has already been discussed that classroom-based training was not enough on its own, the other phases were necessary components to ensure high levels of implementation and overall student success.

All three paraprofessionals reported liking the strategy, and that they felt their student was responding well to the new strategy. One paraprofessional even reported using the strategy at home and teaching her husband. The data collected through field notes and anecdotally through video analysis further supported the paraprofessionals receptiveness to the new strategy. Paraprofessionals generalized the strategy outside of data collection sessions, demonstrated improved relationships with their students, and increased trust between them and their student. Acceptability of the strategy extended beyond the paraprofessionals who participated in this study. During the classroom-based training, the paraprofessionals and teachers who participated along with the student participants voiced similar acceptance. Each group asked why the strategy had not yet been taught widely at the agency, suggesting that the entire campus needed to learn this strategy.

### **Discussion: Student Response to Hand Under Hand Instruction**

The teaching strategy of hand under hand was targeted for this study because it is widely used in the field of visual impairments and blindness to provide information and modeling to students. When aligned with Vygotsky's theories of ZPD and spontaneous concept development, this method considers how students learn and what they need to make sense of their environment and learning experiences. ZPD requires a "more knowledgeable other" to create active learning experiences that are meaningful and individualized. The "more knowledgeable other" was situated in this study in two ways: first, as the researcher providing information to the paraprofessionals, in a dynamic method for individual sensemaking, or within each paraprofessional's ZPD for learning. Second, the "more knowledgeable other" was then situated as the paraprofessionals joined each student in their ZPD, creating an environment where the students were

ready to be active participants developing meaning through hands on learning opportunities.

While it was encouraging to see that the intervention is effective in changing the behaviors of adults, the real testament is in how the students responded to the new strategy. Not only did the paraprofessionals report feeling that their students responded positively to the change in physical assistance offered, but their behavioral data also demonstrated that all students became more active in their learning, and more willing to participate in activities. The students increased in their performance, independence and demonstrated reduced resistance during the 1:1 structured activity of “tasking.” In triangulating the data collected on all three participant pairs, three main findings were identified. All students were observed to initiate or join learning opportunities more quickly, as all three adults learned to implement the strategy with higher levels of efficacy, each student was observed to increase their overall independence in given tasks; and the use of hand under hand offered a method for teaching new skills and replacement behaviors.

One theme that emerged in the analysis of data on all three student participants, is that throughout the intervention they were observed to initiate and/or join activities more quickly as hand under hand was implemented with consistency. Paraprofessionals were taught to use hand under hand as a method to invite a student to join them in an activity, placing the student in control over when and how an interaction took place. As the paraprofessionals became more comfortable in this process, the students started to reach out more willingly and even started to reach out in response to the materials being presented before any verbal or physical prompts. While all three students were observed to make this shift in how they participated, the most prominent examples were Claire and Kevin. At baseline, Claire would see materials and immediately try to grab and throw

them. By the end of the intervention, she was reaching right out to help complete the tasks as directed. At baseline Kevin was observed to just sit and wait; he would rarely reach out to engage or complete an activity until he was prompted. At the end of the study, he would reach right out to join Leslie in completing tasks.

Throughout the course of the intervention, all three adults learned to extend the hand under hand strategy to include other strategies such as role release, partial participation, and backwards chaining, (as defined in glossary) which facilitated instruction using each of the four HLPs described in chapter two. The extended use of hand under hand also provided instruction in alignment with each student's individual ZPD, creating an environment where they were ready and able to learn. Through these strategies, students' independence increased in addition to their active participation and demonstration of their willingness to participate.

Finally, what came through in the data was that the implementation of hand under hand provided an opportunity to teach new skills and replacement behaviors. For example, throughout baseline Leslie and Kevin spend a lot of time waiting for each other. Leslie was waiting for Kevin to participate or initiate, and Kevin was waiting for Leslie to help him complete the task. As the intervention progressed, Leslie was able to utilize hand under hand to teach Kevin what was expected for each activity, and in turn, Kevin started reaching out to complete the steps that he could. Similarly, Claire was taught a replacement behavior for throwing materials as soon as they were within her reach. Through the use of hand under hand, Diane was able to control the learning experience and teach Claire a different way of interacting with the materials.

### **Relationship to Existing Research**

Hand under hand was targeted as the teaching strategy for this dissertation due to it being widely used in the field of deafblindness and visual disabilities. Although it is

widely used, there is a limited research base available to support the effectiveness of the strategy. Hand under hand is a strategy that provides an opportunity for a learner to observe what the hands are doing (Sacks, 2016) while also offering the learner greater control of the activity (Lewis & Allman, 2014). Hand under hand can and should be used to teach students in all areas of the ECC and can be a method for providing HLPs. In education there is a push to have students educated through EBP (Guckert et al., 2016) and/or HLP as developed by CEC (2017). In Chapter Two, hand under hand was connected to four of the HLPs established by CEC: providing scaffolding supports, using explicit instruction, use of strategies to promote active student engagement, and providing intensive instruction. Within the course of this study, each of these HLPs were present as the paraprofessionals learned to implement and imbed hand under hand into their 1:1 instruction time.

Students with visual impairments often don't have access to the scaffolding supports as described and defined by CEC (2017), which include visual, verbal, and written supports. In this study, hand under hand is a method that demonstrated scaffolding through tactile modeling, with the paraprofessionals showing the students what was expected, then slowly role releasing expectations. Similarly, to provide explicit instruction, hand under hand was demonstrated to show students how to complete a task. Due to the unique needs of a student who is visually impaired, telling a student how to complete a task or solve a problem is not enough, due to the way language development occurs. Hand under hand provided access to explicit instruction that was originally being neglected. This was evident in the way Leslie would provide verbal and visual instructions to her student Kevin, then just wait for him to respond. When she received the intervention, she was able to provide explicit instruction on what was expected, and he then completed tasks accordingly.

One of the major findings of this study was that when instruction was provided through hand under hand instruction, all three students became more active in their participation. The third HLP aligned with hand under hand instruction was HLP18, use of strategies to promote active student engagement. CEC (2017) described active student engagement as being critical to overall success, and necessary to build student-teacher relationships and motivate learners. The data collected in this study confirmed that for these student participants, hand under hand did equate to active participation. In addition, it built trust and improved relationships. Hand under hand was identified as a strategy that utilized well-paced instruction as identified in HLP20, to provide intensive instruction. Each paraprofessional implemented the same strategy in a method that matched the needs of their students, indicating that not only was it effective, but it could also be differentiated based on student needs.

### **Discussion: Final Thoughts**

This dissertation was developed through the lens of sensemaking, sociocultural theory, Vygotsky's ZPD and his theory on concept development. The data collected indicated that there was a connection between the intervention and the adult's implementation of the target teaching strategy, offering a method for future training of paraprofessionals on necessary topics and teaching skills. All paraprofessionals reported that they enjoyed the training process, with an emphasis on the final phase of training, on-the-job monitoring with feedback. While no data were collected immediately following the classroom-based training portion of the intervention, data derived from the various sources led to a theme that suggested classroom-based training on its own was not enough to ensure high levels of implementation.

There was also a connection between the implementation of hand under hand and students' change in behavior. There are limitations discussed below associated with



the observed changes in student behavior, however, it can't be denied that each of the three student participants demonstrated a positive trend in their levels of active involvement and willingness to participate in daily classroom activities. When the adults in this study were trained in a phased method that accounted for individualized support and provided ample opportunities to make sense of the information in alignment with what they already knew, behavioral change occurred at a high level that remained consistent over time and through maintenance. This change in adults' behavior and the new way of providing instruction to students who are visually impaired created a learning environment that was situated within each student's zone of proximal development and readiness to learn.

### **Limitations**

Reporting of the limitations is critical for the identification of credibility in findings, and to help other researchers that might want to conduct a similar study (Clark & Creswell, 2014). Three main limitations were identified with this single subject multiple baseline action research dissertation. First, it can be questioned whether changes in student behavior were associated with the intervention or other outside factors. Second, the effects of researcher positionality in the classrooms participating in the study may have impacted results. The researcher had an obligation to continue providing direct instruction to students in two of the three participating classrooms, which could have influenced paraprofessionals' implementation and generalization of the targeted strategy. Finally, student and paraprofessional absences causing missed data collection sessions.

### **Outside factors affecting Student Behavioral Changes**

Although data was collected on student behavior during the structured daily activity known as tasking, potential limitations arose associated with unanticipated

changes that took place during this daily classroom activity. To ensure consistency in the intervention, each paraprofessional had to make changes to the activities students were completing. Specifically, new activities were added, instruction during this time was provided by one consistent staff member, and, finally, Leslie introduced visual accommodations and material modifications for her student.

### ***Change in Activities***

Prior to the start of this study, the researcher worked with the classroom teachers to ensure each student had enough activities planned and available during this time that worked towards their IEP goals, were meaningful, and would require ample opportunities for the adults to offer physical assistance. However, additional activities were added. For example, Claire was provided with new activities throughout the study; each time a new activity was added to her regular sequence, she demonstrated an increase in resistance. Neither Kevin nor James was provided with new activities after the onset of the study, therefore no observations were made on their responses to new activities. It is unclear whether new activities provided at the initiation of the study influenced students' behavior, but it is worth mentioning and drawing attention to for future research.

### ***Addition of Consistent Staff Members***

Another change that occurred for all three student participants was the daily activity of tasking being led consistently by one adult. The classroom routines for each of the classrooms that participated in the study usually rotate staff daily, meaning that prior to the study, students worked with a different adult each day during this routine. Consistency in implementation for students with visual impairments and co-occurring disabilities could lead to an increased sense of trust, and ultimately a positive shift in involvement and participation in tasks. There is no way to measure the effect this factor

had on the results obtained through this study, but again it is worth identifying for any future studies following a similar design.

### ***Visual Accommodations Implemented***

Finally, Leslie implemented material accommodations that could have led to a change in Kevin's involvement and participation. Diane and Jamie did not make any visual or material accommodations, which means this limitation is only associated with Leslie and Kevin. Leslie became empowered following her session of 1:1 coaching, and with her years of background working with students who have visual impairments, she decided to implement some visual accommodations. They adjusted the materials to include higher contrast and reduced the number of items on a surface, which alleviated visual clutter for Kevin. She also traded out 1-inch cubes for cubes that were much larger and therefore easier for him to see and grasp. These accommodations were made by Leslie in isolation from the researcher and implemented following her on-the-job monitoring with feedback sessions. Leslie is commended for her initiative in meeting Kevin's needs, but this change could also account for the observable behavior shift demonstrated by the student.

### **Researcher Positionality**

In the role of a participatory action researcher, there was a unique opportunity to continue working with the student participants and alongside the paraprofessionals throughout the duration of the study while providing weekly direct services for two of the three students participants. While intentionality was placed on not inviting paraprofessionals to join lessons or provide coaching while working with students, there was still the opportunity for them to learn from the researcher during regular student instruction.

Throughout the study, the researcher had an obligation to continue providing direct services to student participants, in addition to other students in their classrooms. For one classroom, direct services were provided to the student participant and two additional students in the class, and for another classroom direct and consultative services were provided to every student in the classroom. The effect of the researcher being in the classroom, using hand under hand as instruction was provided to the participant and other students, could have led to some unintentional sensegiving to the paraprofessionals. The researcher's position in the classrooms offered an opportunity for paraprofessionals to observe the researcher working with students using the teaching strategy targeted for the study. One classroom was not offered the same opportunity, as direct instruction was not provided to the student participant or any peers in the classroom. While the additional exposure could have influenced the paraprofessionals' implementation and generalization of the hand under hand teaching strategy, it is unlikely, since all three paraprofessionals demonstrated similar results in response to the intervention and one was not afforded any additional exposure.

### **Participant Absences**

The final limitation being recognized is that there were numerous missed data collection sessions due to participant absences. Each of the three participant pairs experienced missed sessions due to unforeseen circumstances which were disclosed in Chapter Four. Although missed sessions could have had a potential effect on the overall results of this study, the results suggest this was not the case.

### **Possible Implications**

This study was originally designed with the intention to train paraprofessionals and teachers on strategies necessary when working with their students who have visual impairments. There was a desire to find an efficient method for sharing knowledge and

information that would lead to a high level of understanding and efficacy in implementation. The training protocol established, and the data collected on social acceptability and student response to the new teaching strategy, lead to the identification of two possible implications. First, the importance of better training techniques when a TVI is transferring new strategies and skills to staff members in classrooms, and then expanded training on the hand under hand strategy throughout the school where this study occurred.

### ***Intentional Training Techniques***

The training protocol was well received and effective in teaching a paraprofessional to replace hand over hand with hand under hand instruction. Two of the paraprofessionals made it evident that classroom-based, lecture forms of training are not enough. Yet, these approaches encompass the majority of training and development provided. No longer can we assume that a lecture based training or a short meeting with a teacher on a strategy is enough to ensure a high level of efficacy. The Teaching Skills Training Program was replicated due to the tiered training it provided, accounting for different learning styles and ongoing feedback from a professional. The existing research on the Teaching Skills Training Program also suggested that the length of time necessary to provide adequate training was flexible; it could be lengthened and shortened to meet the needs of participants and strategies being taught. Moving forward, when TVI's, or other specialists, are training or sharing information with the professionals working with students daily, consideration should be placed on how that information is shared. This research suggests that lecture based information should be followed up with modeling and opportunities for observation and feedback. To best support students, the transferring of knowledge to others must be intentional.

### ***Expansion of Hand Under Hand***

Another possible implication is that within the local context, additional professionals would benefit from being trained, using a structured training protocol, on the hand under hand teaching strategy. Hand over hand instruction has its place as a form of physical assistance, but hand under hand is powerful in its ability to serve the same purpose and offer dignity, opportunities for active participation, a desire to participate, and increased independence. The evidence in this study suggests that this strategy could be beneficial for other students and adults serving them, not only to increase participation and reduce resistance, but also to build trust and improve adult student relationships.

### **Future Possibilities**

The future possibilities on this topic are endless! Hand under hand as a teaching strategy is not well researched, and the literature that does exist is limited to the field of deafblindness and is only emerging in the field of visual disabilities. A google search will lead to the use of hand under hand when working with elderly patients who have Alzheimer's, and some websites/blogs in the field of occupational therapy. The conversation is expanding, but additional research is necessary to continue this momentum. In the conclusion of this dissertation, two future possibilities for this work emerge. First, additional, and expansive research that goes beyond students who are deafblind or visually impaired is needed, and a deeper understanding for hand under hand as a teaching strategy.

### ***Additional Research***

The research possibilities for the hand under hand teaching strategy are numerous. Additional studies, like the one conducted in this dissertation, are critical. The findings of this study suggest a functional relationship between the intervention

provided and adult implementation of the hand under hand strategy in place of hand over hand, as well as changes in students involvement and participation in adult led tasks. This study alone is not enough to identify hand under hand as an evidence based practice, therefore, additional studies replicating this one is necessary to expand that literature based. Furthermore, quantitative, mixed methods, and qualitative studies are necessary to further explore themes that came across in the data but were not in alignment with the guiding research questions, which will be discussed in more depth in the next section.

The literature base would benefit from additional studies that take place in a variety of settings, with a variety of learners, with and without visual impairments. A literature base that demonstrates the effectiveness of replacing hand over hand with hand under hand instruction across activities and types of learners needs to be developed. This dissertation, and years spent at a private school setting for students with developmental disabilities, has led to the hypothesis that hand under hand instruction is appropriate for all learners. It is possible that this is a strategy that can be utilized exclusively when needed to help or support students in any educational setting; more research is necessary.

### ***Hand Under Hand, more than a Teaching Strategy***

During this dissertation, confusion about hand under hand as a teaching strategy, compared to it being used as a form of physical assistance, came to light. This confusion was first made evident during a conversation with a speech therapist and became more apparent as the researcher attended a training on prompt hierarchy. It became apparent that some confusion received from others was a miscommunication and a difference in understanding of what hand under hand is. Is hand under hand a form of prompting nestled in the most restrictive location of the prompt hierarchy? Or is hand under hand a

strategy for teaching? The researcher holds the perspective that hand under hand is a method for teaching, which leads to the final thought and potential future possibilities derived from this work.

The existing literature talks about how to use hand under hand through the adult placing their hands under the hands of the student to complete a task together. The literature is focused on learners who are deafblind and is emerging in the field of visual disabilities. Hand under hand support is also discussed in the literature on prompting and is considered within the most restrictive prompt level of physical assistance. These are two competing mindsets or schools of thought. A theme that emerged in the data analysis, but was situated outside the guiding research questions, was this idea that the use of hand under hand is more than a teaching strategy, or form of physical assistance, it is a method that facilitates learning.

While training people to use hand under hand instruction, the strategy was described to encourage active and authentic participation in learners who are choosing to join an adult in an activity. The benefits of building a relationship that is situated in trust and creating an environment invites a student to join the adult in an activity, rather than forcing them to participate. Hand under hand is a method that provides learners with a sense of control and demonstrates mutual respect that allows for positive interactions between the adult and the student. Instruction on how to use hand under hand as a teaching tool encourages independence and facilitates other teaching practices, such as backwards chaining, role release, and partial participation (as defined in the glossary) which are all nestled within the existing HLPs.

Hand under hand is more than a teaching strategy, it is a method or mindset for how we facilitate learning to some of our most challenging learners. When approaching a student through the mindset of hand under hand instruction, we are shifting our



expectations of how a student participates and our overall outcomes. When working with students who are challenging or resistant to instruction, it appears that the use of hand over hand is geared toward completion of a task or following through on direction and simply getting the activity completed. When that same activity, with the same student, is approached through hand under hand, the intention shifts to joint participation, which can then lead to increased trust and future independence. It leads to teaching.

This shift in mindset is challenging for many, especially those looking through the lens of behavior or students' refusal to participate. Hand under hand can be perceived as a way that students are "getting out of work" or that the adult is doing everything for them, which is not accurate. When instruction is provided through hand over hand, the student is going through the motions, but each step is 100% controlled and completed by the adult manipulating the student's hand. It creates a passive form of participation, which was evident in the data, whereas hand under hand requires a student to choose to join. Hand under hand creates an authentic, active learning environment, which again points to a shift in mindset held by the adult's providing instruction. Hand under hand is more than a teaching strategy or form of physical assistance, it is a method for facilitating learning and needs to be explored further to better understand the nuances and true essence it has to offer.

### **Conclusion**

The start of this dissertation opened with a vignette about a student with a visual impairment attending school in a self-contained classroom for sighted students with developmental disabilities. The student was described as passive, frustrated, resistant, pulling away from physical assistance, and refusing to participate. The student in the

vignette demonstrated characteristics similar to the students who participated in this study.

Students who have visual impairments, including those who have co-occurring disabilities, require specialized instruction from someone trained in what makes this population and their learning needs unique. Through a structured and intentional training protocol and the study conducted, three paraprofessionals were trained to implement one teaching strategy at a high level of efficacy in a short period of time. The implementation of hand under hand instruction led to an increase in active participation and reduced resistance to 1:1 learning activities. The findings in this study suggest that paraprofessionals can be trained in conjunction with their supervising teacher on strategies that will better equip them to meet the unique needs of their students with visual impairments, and that the implementation of just one strategy, hand under hand instruction, can change the trajectory of the learning that occurs in the classroom.

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APPENDIX A  
SURVEY QUESTIONS



### **Pre-intervention: Demographic Information Following Recruitment**

Thank you for agreeing to participate in this study. Before we start with data collection and the intervention, please complete this short survey.

- What is your current level of education?
  - High School
  - GED
  - Certificate in an education-related field
  - Associates degree
  - Bachelor's degree
  - Master's degree
  - Doctorate
- How long have you worked at ACCEL?
  - This is my first year
  - 1-2 years
  - 3-5 years
  - 6-20 years
  - 11-15 years
  - 15+
- How long have you worked with students with disabilities?
  - This is my first year
  - 1-2 years
  - 3-5 years
  - 6-20 years
  - 11-15 years
  - 15+
- How long have you worked in a self-contained classroom for students with disabilities, including your time at ACCEL? *Self-contained classrooms refers to a class specific to students with disabilities, no general education students enrolled in the classroom. This can be a self-contained classroom within a public school or a private school similar to ACCEL.*
  - This is my first year
  - 1-2 years
  - 3-5 years
  - 6-20 years
  - 11-15 years
- Approximately how many students with visual impairments have you worked with? *Visual impairment refers to any student with a diagnosed eye condition that requires educational support from a Teacher of the Visually Impaired*
  - As far as I am aware, I have never worked with a student who has a visual impairment
  - 1-5 students
  - 6-10 students

- 11-15 students
- 16-20 students
- 20+ students
- Have you received any training or coaching on strategies that are effective when working with your students who have visual impairments?
  - Yes
  - No
  - I can't remember
- If you have received any training or coaching, please describe the types of training or coaching you have received, including any specific topics or strategies you have been trained on. (Open dialog)
- Do you feel confident in your ability to teach or work with students who have visual impairments?
  - Yes
  - No
- Please elaborate on your confidence level in teaching or working with students who have visual impairments. (Open dialog)

### **Following Tier 1: Classroom-based Training**

You have just completed classroom-based training on the teaching strategy called hand under hand instruction. The training included a lecture portion and role-playing with feedback. Please reflect on the classroom-based training as you answer the following questions:

#### ***Construct 1: Acceptability of the training process***

- How would you rate the classroom-based portion of the training process?
  - Excellent
  - Good
  - Fair
  - Poor
  - Very Poor

#### ***Construct 2: Acceptability of teaching strategy***

- What are your initial thoughts and feelings toward the hand under hand teaching strategy?
  - I really like the hand under hand strategy
  - I am uncertain about the hand under hand strategy
  - I do not like the hand under hand strategy
- How likely are you to try the hand under hand teaching strategy when working 1:1 with students?
  - I will definitely try using hand under hand
  - I will probably try using hand under hand

- I might try using hand under hand
- I will probably not try using hand under hand
- I will definitely not try using hand under hand
- If you plan to try the hand under hand strategy, please describe an activity where you can see yourself using the strategy while working 1:1 with a student. (Open dialog)
- Please describe any challenges you anticipate using the hand under hand strategy. (Open dialog)

***Construct 3: Perceptions of student response to teaching strategy***

- In your opinion, how do you feel your students will respond to instruction provided through hand under hand instruction instead of hand over hand instruction?
  - I feel like the students will respond well to the hand under hand strategy
  - I feel like the students will be unsure of how to participate with the hand under hand strategy
  - I feel like the students will not participate with the hand under hand strategy
- In your own words, describe how you feel your students will respond to hand under hand instruction instead of hand over hand instruction. (Open Dialog)
- You just learned a new teaching strategy and will get to practice with a student for the first time tomorrow. What do you anticipate your student’s level of involvement in activities to be when hand under hand instruction is used in place of hand over hand instruction?
  - I anticipate that the student will be willing to participate in activities when hand under hand instruction is used.
  - I anticipate that the student will be resistant to participating in activities when hand under hand instruction is used.
  - I am unsure how the use of hand under hand will affect my student’s level of involvement in activities.
- You just learned a new teaching strategy and will get to practice with a student for the first time tomorrow. What do you anticipate your student’s level of participation in activities to be when hand under hand instruction is used in place of hand over hand instruction?
  - I anticipate that the student will be an active participant in activities when hand under hand instruction is used.
  - I anticipate that the student will be a passive participant when hand under hand instruction is used.
  - I am unsure who the use of hand under hand will affect my student’s level of participation.

**Following Tier 2: On-the-Job Coaching**

You have just received one session of on-the-job coaching provided by the researcher on the implementation and use of hand under hand while working directly with a student. This portion of the training process involved modeling the strategy by the researcher and feedback on your implementation in the moment. Please reflect on the one-to-one coaching you just received and answer the following questions:

***Construct 1: Acceptability of the training process***

- How would you rate the one-to-one coaching portion of the training process?
  - Excellent
  - Good
  - Fair
  - Poor
  - Very Poor
- What is something you liked about this portion of the training process? (Open dialog)
- What could be done to improve this portion of the training process? (Open dialog)

***Construct 2: Acceptability of teaching strategy***

- After practicing the hand under hand strategy individually and having 1:1 coaching, how are you feeling about using the hand under hand teaching strategy?
  - I really like the hand under hand strategy
  - I am uncertain about the hand under hand strategy
  - I do not like the hand under hand strategy
- How would you rate your confidence in using the hand under hand teaching strategy when working 1:1 with students?
  - I am confident in my ability to use the hand under hand strategy when working 1:1 with students
  - I feel confident that I can use the hand under hand teaching strategy when working 1:1 with students, but I still need to practice
  - I do not feel confident in my ability to use the hand under hand strategy
- Please describe an activity where you feel you have been successful in using the hand under hand strategy. (Open dialog)
- Please describe an activity where you have tried to use hand under hand but have found it challenging. (Open dialog)

***Construct 3: Perceptions of student response to teaching strategy***

- In your opinion, how do you feel your students have responded to instruction provided through hand under hand instruction instead of hand over hand instruction?
  - I feel like the students have responded well to the hand under hand strategy

- I feel like the students are unsure of how to participate with the hand under hand strategy
- I feel like the students have not participated with the hand under hand strategy
- In your own words describe how you feel your students are responding to hand under hand instruction in place of hand over hand instruction. (Open Dialog)

### **Following Tier 3: On-the-Job Monitoring and Feedback**

You have just received three sessions of on-the-job monitoring and feedback provided by the researcher. This included being observed by the researcher, then being provided feedback on your implementation of the hand under hand strategy. Please reflect on the on-the-job monitoring and feedback you just received and answer the following questions:

#### ***Construct 1: Acceptability of the training process***

- How would you rate the on-the-job monitoring with feedback portion of the training process?
  - Excellent
  - Good
  - Fair
  - Poor
  - Very Poor
- What is something you liked about this portion of the training process? (Open dialog)
- What do you think could be done to improve this portion of the training process? (Open dialog)

#### ***Construct 2: Acceptability of teaching strategy***

- After practicing the hand under hand strategy individually and receiving monitoring with feedback, how are you feeling about the hand under hand teaching strategy?
  - I really like the hand under hand strategy
  - I am uncertain about the hand under hand strategy
  - I do not like the hand under hand strategy
- How would you rate your confidence in using the hand under hand teaching strategy when working 1:1 with students?
  - I am confident in my ability to use the hand under hand strategy when working 1:1 with students
  - I feel confident that I can use the hand under hand teaching strategy when working 1:1 with students, but I still need to practice
  - I do not feel confident in my ability to use the hand under hand strategy
- Please describe an activity where you feel you have been successful in using the hand under hand strategy. (Open dialog)

- Please describe an activity where you have tried to use hand under hand but have found it challenging. (Open dialog)

***Construct 3: Perceptions of student response to teaching strategy***

- In your opinion, how do you feel your students are responding to instruction provided through hand under hand instruction instead of hand over hand instruction?
  - I feel like the students have responded well to the hand under hand strategy
  - I feel like the students are unsure of how to participate with the hand under hand strategy
  - I feel like the students have not participated with the hand under hand strategy
- In your own words describe how you feel your students responded to hand under hand instruction in place of hand over hand instruction. (Open Dialog)

**At Conclusion**

You have completed the study! Thank you again for participating in the full duration of the study, which included being trained in the use of hand under hand instruction. You were provided classroom-based training with role playing, 1 session of 1:1 coaching and a minimum of 3 observations with immediate feedback. Please reflect on the entire training process and the implementation of hand under hand instruction in place of hand over hand instruction.

***Construct 1: Acceptability of the training process***

- How would you rate the entire training process (classroom-based training, 1:1 coaching, observation with feedback)?
  - Excellent
  - Good
  - Fair
  - Poor
  - Very Poor
- What is something you liked about this training process (classroom-based training, 1:1 coaching, observation with feedback)? (Open dialog)
- What do you think could be done to improve this training process (classroom-based training, 1:1 coaching, observation with feedback)? (Open dialog)
- After receiving the entire training process (classroom-based training, 1:1 coaching, observation with feedback) which stage of training do you think best taught you how to use the hand under hand strategy?
  - Classroom based training
  - 1:1 coaching
  - Observation with feedback
  - I benefitted from all three forms of training

- Unsure
- After receiving the entire training process (classroom-based training, 1:1 coaching, observation with feedback) which stage of training do you think was least effective in teaching you how to use the hand under hand strategy?
  - Classroom based training
  - 1:1 coaching
  - Observation with feedback
  - Unsure

***Construct 2: Acceptability of teaching strategy***

- After receiving the entire training process (classroom-based training, 1:1 coaching, observation with feedback), how do you feel about the hand under hand teaching strategy?
  - I really like the hand under hand strategy
  - I am uncertain about the hand under hand strategy
  - I do not like the hand under hand strategy
- After receiving the entire training process (classroom-based training, 1:1 coaching, observation with feedback) how would you rate your confidence in using the hand under hand teaching strategy when working 1:1 with students?
  - I am confident in my ability to use the hand under hand strategy when working 1:1 with students
  - I feel confident that I can use the hand under hand teaching strategy when working 1:1 with students, but I still need to practice
  - I do not feel confident in my ability to use the hand under hand strategy
- Please describe what you have enjoyed since implementing the hand under hand strategy when working 1:1 with your student. (Open dialog)
- Please describe anything that did not go well when implementing the hand under hand strategy when working 1:1 with your student. (Open dialog)

***Construct 3: Perceptions of student response to teaching strategy***

- In your opinion, how do you feel your students responded to instruction provided through hand under hand instruction instead of hand over hand instruction?
  - I feel like the students have responded well to the hand under hand strategy
  - I feel like the students are unsure of how to participate with the hand under hand strategy
  - I feel like the students have not participated with the hand under hand strategy
- In your own words describe how you feel your students responded to hand under hand instruction in place of hand over hand instruction. Please share an example here if you can think of one. (Open Dialog)
- Did you notice any overall changes in your student's participation in tasks completed during 1:1 teaching using the hand under hand strategy?

- Yes
  - No
  - Unsure
- Did you notice any overall changes in your students' level of involvement in tasks completed during 1:1 teaching using the hand under hand strategy?
  - Yes
  - No
  - Unsure
- Please describe any changes you noticed in your student's level of participation and/or involvement (positive or negative) in 1:1 tasks when you provided instruction through use of the hand under hand teaching strategy.



APPENDIX B

FIDELITY OF IMPLEMENTATION CHECK ONE: CLASSROOM-BASED TRAINING

Training Date: \_\_\_\_\_

**Procedure:**

- Classroom based training will be recorded and reviewed by researcher and outside rater
- Observations will be made to indicate whether each step of the plan was implemented as described in the dissertation
- Classroom teams participating in the classroom based training will complete the same checklist following classroom based training as an “exit ticket”

	<b>Occurred</b>
<b>Simulation activity</b>	
Participant played role of student	
Participant played role of teacher	
<b>Lecture</b>	
HUH Defined	
Instructed on how to use HUH	
Offered ways to prompt or initiate HUH	
Offered types of activities where HUH would be helpful	
<b>Video Examples</b>	
Included students of different ages	
Included students of different abilities	
Included the use of HUH in different activities/routines	
<b>Role play with coaching</b>	
Participant played role of student	
Participant played role of teacher	
Participant received 1st rounds of feedback	
Participant received 2nd round of feedback	
Participant received 3rd round of feedback	

APPENDIX C

FIDELITY OF IMPLEMENTATION CHECK TWO: ON-THE-JOB COACHING

Participant \_\_\_\_\_  
On-the-Job Coaching Date: \_\_\_\_\_

**Procedure:**

- Each participant will receive one round of on-the-job coaching following classroom-based training
- The supervising teacher of the study participant will complete this form to confirm that on-the-job coaching was offered to participant

**Fidelity Check by Participants Supervising Teacher:**

1. Was on-the-job coaching provided to paraprofessional participating in the study?  
Yes    No
2. What time did on-the-job coaching occur? \_\_\_\_\_

APPENDIX D

FIDELITY OF IMPLEMENTATION CHECK THREE: ON-THE-JOB MONITORING  
WITH FEEDBACK

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

On-the- job monitoring with feedback session: 1 2 3

Time: \_\_\_\_\_

**Procedure:**

- Researcher will audio record the feedback portion of Tier 3
- The researcher, participant, and outside rater will review the recording and mark that each step of the feedback protocol occurred

	<b>Occurred</b>
A positive or empathetic general statement was made about the session	
Praise was offered for identifying an opportunity to performing teaching skill correctly	
An opportunity in which the teaching skill may have been performed incorrectly was identified and a description of how to correctly perform the targeted teaching skill was offered **	
An opportunity to ask questions regarding the feedback was offered to the participant?	
The feedback session ended with a final positive or encouraging statement	

*\*\*If there were no opportunities in which the teaching strategy was performed incorrectly, acknowledgement of 100% accuracy was made*

APPENDIX E  
ACCEPTABILITY OF TRAINING PACKAGE

## Likert Scale Ratings

*Following each phase of intervention*

Question:

	Classroom based training	On-the-Job Coaching	On-the-Job Monitoring with Feedback
Participant 1	Excellent	Excellent	Excellent
Participant 2	Excellent	Excellent	Excellent
Participant 3	Excellent	Excellent	Excellent

*Completion of training package*

Question:

	Overall Rating	Most beneficial	Least effective
Participant 1	Excellent	Observations with Feedback	Unsure
Participant 2	Excellent	All Three Components	Classroom-based Training
Participant 3	Excellent	All Three Components	Unsure

## Open-ended questions

	What is something you liked about this portion of the training process?	What do you think could be done to improve this portion of the training process?
On-the-job coaching	Explanations both verbal and visual feedback	No improvement need to happen. The training is well thought out and explained Everything was perfect during the training.
On-the-job monitoring with feedback	Enjoyed feedback and tips Liked receiving feedback to questions Feedback and response to questions	Nothing needs to be changed, all feedback and techniques shown have given me great results n/a



Entire Training Package	Very informative Improved relationship with student 1:1 coaching helped when needing feedback	Nothing needs to be changed n/a
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APPENDIX F

ACCEPTABILITY OF THE HAND UNDER HAND STRATEGY

**Likert Scale**

*Following classroom-based training*

How likely are you to try the hand under hand strategy?		
P1: Definitely Try	P2: Definitely Try	P3: Definitely Try

*Following each subsequent phase of the intervention*

Overall feeling			
On-the-job coaching	P1: I really like	P2: I really like	P3: I really like
On-the-job monitoring with feedback	P1: I really like	P2: I really like	P3: I really like
Completion	P1: I really like	P2: I really like	P3: I really like
Confidence			
On-the-job coaching	P1: Confident	P2: Confident but need practice	P3: Confident
On-the-job monitoring with Feedback	P1: Confident	P2: Confident	P3: Confident
Completion	P1: Confident	P2: Confident	P3: Confident

## Open ended questions

### *Following Classroom Based Training*

If you plan to try the hand under hand strategy, please describe an activity where you can see yourself using the strategy while working 1:1 with a student.
<ul style="list-style-type: none"><li>• Tasking “work” activities like ring stacker or pop beads</li><li>• During large group, or any activity during the day</li><li>• If a student needs help during daily living, such as getting dressed</li><li>• During any motor activities</li></ul>
Please describe any challenges you anticipate using the hand under hand strategy.
<ul style="list-style-type: none"><li>• I have not had any challenges yet</li><li>• Student reliance on adults completing a task</li><li>• Eyes wandering, not visually engaged with the task/activity</li></ul>

### *Following On-the-Job Coaching*

Please describe an activity where you feel you have been successful in using the hand under hand strategy.
<ul style="list-style-type: none"><li>• Daily tasking, my student does not tolerate holding of items</li><li>• Cutting with scissors, my student was not as stressed because I could help more than usual</li><li>• Completing a picture matching activity</li></ul>
Please describe an activity where you have tried to use hand under hand but have found it challenging.
<ul style="list-style-type: none"><li>• No challenging activities</li><li>• When you are trying to help the student through hand under hand and their eyes are not engaged, I feel like they are taking advantage of the help</li></ul>

### *Following On-the-Job Monitoring with Feedback*

Please describe an activity where you feel you have been successful in using the hand under hand strategy.
<ul style="list-style-type: none"><li>• During ring stacker and pop beads, my student is starting to show interest in using both hands</li><li>• Working on buckles, me and my student were working great together</li><li>• Working on IEP goals and other fine motor activities</li></ul>
Please describe an activity where you have tried to use hand under hand but have found it challenging.
<ul style="list-style-type: none"><li>• No challenges</li><li>• When working on a zipper, but then I changed the materials, and it was easier</li></ul>

- |   |
|---|
| <ul style="list-style-type: none"><li>• Getting my student to reach out further than before</li></ul> |
|---|

*Conclusion*

Please describe what you have enjoyed since implementing the hand under hand strategy when working 1:1 with your student.
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- |  |
|--|
| <ul style="list-style-type: none"><li>• I've enjoyed the progression of my student during each task.</li><li>• I have enjoyed how my student didn't show much stress after working through hand under hand.</li><li>• I have also enjoyed watching my student accomplish all the goals he came across.</li><li>• That the student is more interested in participating.</li></ul> |
|--|

Please describe anything that did not go well when implementing the hand under hand strategy when working 1:1 with your student.
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- |  |
|--|
| <ul style="list-style-type: none"><li>• I have not experienced this problem yet.</li><li>• N/A</li></ul> |
|--|

APPENDIX G

PARAPROFESSIONAL PERCEPTIONS OF STUDENT RESPONSE

## **Open ended questions**

### *Following Classroom Based Training*

In your own words, describe how you feel your students will respond to hand under hand instruction instead of hand over hand instruction.

- My student does not respond well to hand over hand. Hand under hand has made her want to be more engaged in the activities because less force is being used.
- I feel it will be a learning experience for both of us. Then once they get the hang of it, they will just pick up everything quickly.
- I feel that the students will be more interested in learning

### *Following On-the-Job Coaching*

In your own words describe how you feel your students are responding to hand under hand instruction in place of hand over hand instruction.

- I feel like she loves it and is very responsive to hand under hand because it's less forceful.
- I feel like my student is just unsure of what we're trying to do but once he catches on you can see the instant relief and less aggression.
- I feel that the hand under hand really helps the students.

### *Following On-the-Job Monitoring with Feedback*

In your own words describe how you feel your students responded to hand under hand instruction in place of hand over hand instruction.

- She has become less aggressive and completes every activity in a shorter amount of time.
- My student looks like he's already understanding the strategy. He'll place his hands right above mine to get the feel of the instruction and get the help he needs. When he feels confident, he knows when to jump in and take over.
- My student is more interested in learning with hand under hand assistance and more confident about doing motor skills.

### *Survey at Completion*

In your own words describe how you feel your students responded to hand under hand instruction in place of hand over hand instruction. Please share an example here if you can think of one.

- When working with my student using hand over hand it made her more aggressive and unwilling to participate in any structured tasking. Using the hand under hand technique has made her more willing to engage in activities herself.

- I feel that my student is still getting used to the new strategy. I will verbally prompt him then grab his hand with my finger to latch on my hands.
- I feel that the students have loved the strategy since it is not as over stimulating as hand over hand.

Please describe any changes you noticed in your students' level of participation and/or involvement (positive or negative) in 1:1 tasks when you provided instruction through use of the hand under hand teaching strategy.

- Very positive, before she would not participate and now, she participates and engages willingly.
- I noticed my student will participate more than before and try to learn different activities/tasks.
- My student doesn't need as much prompting as before.



APPENDIX H  
ASU IRB APPROVAL



APPROVAL: EXPEDITED REVIEW

[Sarup Mathur](#)

MLFTC: Educational Leadership and Innovation, Division of  
 480/965-6893  
 SARUP.MATHUR@asu.edu

Dear [Sarup Mathur](#):

On 12/22/2022 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Effects of the Training Process and Student Response to Hand Under Hand Instruction
Investigator:	<a href="#">Sarup Mathur</a>
IRB ID:	STUDY00017049
Category of review:	(6) Voice, video, digital, or image recordings (7)(a) Behavioral research
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> <li>+ Adult Participant Observation Protocol.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>+ adult participant recruitment methods_11_21_22.pdf, Category: Consent Form;</li> <li>+ Armstrong_IRB Protocol_Spring 2023.docx, Category: IRB Protocol;</li> <li>+ FOI Tier 1_Classroom Based Training.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>+ FOI Tier 2_On the job coaching.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>+ FOI Tier 3_On the job coaching with Feedback.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>+ Minor assent.pdf, Category: Consent Form;</li> </ul>

	<ul style="list-style-type: none"> <li>• minor participant recruitment methods_11_21_22.pdf, Category: Consent Form;</li> <li>• Proposal Survey Questions.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• Recording Protocol.pdf, Category: Participant materials (specific directions for them);</li> <li>• Site Permission_ACCEL.pdf, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc);</li> <li>• Student Participant Observation Protocol.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> </ul>
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The IRB approved the protocol effective 12/22/2022. Continuing review is not required for this study. All modifications to studies approved as Expedited and Full Board must be submitted for review and approval.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Katie Armstrong  
Katie Armstrong  
Sarup Mathur